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This project was composed of two major research experiments and four subsidiary experiments, designed to test alternative ways of constructing and applying occupational problem-solving materials. In Part I, Difficulty Level of Simulated Vocational Problems in Encouraging Career Exploration, it was found that the difficulty level did significantly interact with initial occupational interest when knowledge of the occupations studied was used as a measure. Part II includes four subsidiary studies: (1) Simulated Work Experience: An Attempt To Encourage Career Exploration, (2) An Optimal Grade Level for Career Exploration?, (3) Vocational Information-Seeking Behavior as Affected by a Problem-Solving Work Kit and Set Establishment, and (4) Simulated Work Experience: How Realistic Should It Be? Results from Part III, Orienting Stimuli in Vocational Problem-Solving as Factors in Promoting Career Information Seeking, indicate that subjects who receive their first choices of vocational stimulation kits reported varied information-seeking activities more than did subjects who were denied their first choices. Also, subjects who receive specific questions comparing occupations achieved higher scores on occupational information tests than did subjects who received general questions. (CH)

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VOCATIONAL PROBLEM-SOLVING EXPERIENCES FOR STIMULATING CAREER EXPLORATION AND INTEREST: PHASE II

John D. Krumboltz, Principal Investigator
Ronald D. Baker
and
Richard G. Johnson

with the assistance of
Bruce W. Bergland
Jack A. Hamilton
Dennis E. Nelson
and
Mara L. Southern

August 1968

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Abstract

The general purpose of the Phase II project was to test alternative ways of constructing and applying occupational problem-solving materials. The project was composed of two major research experiments and four subsidiary experiments.

Part I: Difficulty Level of Simulated Vocational Problems in Encouraging Career Exploration

The majority of the studies related to vocational choice have been correlational and have provided counselors with many factors related to vocational choice but with very little that they can do to encourage young people to explore opportunities, broaden interests, and see the alternatives available.

Recent research has demonstrated that procedures which provide young people with realistic though simulated occupational experiences do generate vocational interest and stimulate exploration.

This present study attempted to determine the optimal difficulty level of the occupational problems for students with varying interests and ability levels. Two hundred eighty-eight ninth- and eleventh-grade boys from a school serving a working to lower-middle class community were classified into three ability groups based on grade point averages.

Subjects were presented with simulated vocational problems in sales, medical laboratory technology and X-ray technology, given the information necessary to solve the problems, then given an opportunity to compare their answers with the correct ones and to determine whether or not the number of correct answers achieved met the criterion of a successful performance. The criterion for success was set at three levels of difficulty, easy to attain, moderately difficult, and very difficult to attain. Each subject was assigned at random a problem in one occupation and at one of the three levels of difficulty.

The treatment variables were occupation dealt with and level of difficulty in achieving success. The subject variables were grade level, ability as determined by grade point averages, and initial occupational interest patterns as measured on the Holland Vocational Preference Inventory.

Criterion measures of three types were taken. Expressed interest in learning more about certain occupations including the three occupations dealt with in the booklets, scores on an information test covering the occupation simulated, and incidents of information seeking during the week following treatment were all used as dependent variables.

It was hypothesized that the subjects working under conditions in

which success was moderately difficult to attain would achieve higher scores on all criterion measures than would those working under the easy or difficult conditions.

Of special interest in this study were the effects due to interactions between ability and difficulty levels and between initial occupational interest and difficulty.

Analysis of variance was used to test the main effects and all interactions in the factorial designs which resulted.

Findings

1. On the average, students receiving problem-solving kits in which success was moderately difficult to attain did not significantly indicate more interest in the vocation studied, gain more information about the occupation, or take advantage of more opportunities to seek further vocational information than did students who received kits in which success was either difficult or easy to attain.

2. As hypothesized, difficulty level did significantly interact with initial occupational interest when knowledge of the occupation studied was used as a measure. Difficult kits produced higher information test scores for those with intellectual and artistic interests, moderately difficult kits generated higher scores for those with realistic and social interests, and the easy problem kits resulted in higher scores for subjects with conventional or enterprising interests. The exact nature of these interactions was not hypothesized in advance and needs to be verified in future research. These interactions between initial interest and difficulty level were not found on other measures.

3. Difficulty level as manipulated in this study was not found to interact significantly with ability alone, but two significant third-order interactions were found on interest in sales and on occupational information.

Because the nature of these interactions was not hypothesized in advance, because the two were not consistent with each other, and because they occurred in only two of the seven tests for such interactions, the possibility that they were random occurrences cannot be rejected without further research.

4. Interest in an occupation was generated by problem-solving kits in that occupation. Interest in laboratory technology was significantly greater for those students exposed to problem booklets in that field than for students exposed to the other two fields. Interest in sales was significantly greater for those exposed to the sales booklet. The results were in the same direction for X-ray technology but did not reach the .05 level of significance. This finding that specific occupational interests can be generated by simulated

occupational experiences is in agreement with the results of earlier research in vocational problem-solving.

5. Also supporting the efficacy of occupational simulation in generating specific occupational interests was the finding that the largest number of post card requests for information in each of the three occupational fields came from subjects exposed to the corresponding occupational problem booklet.

6. A statistically significant outcome of this research not hypothesized in advance was a difference between occupations. The laboratory technologist and X-ray technician booklets produced more information seeking than did the sales booklet. Whether differences were due to the nature of the occupations themselves, the particular problems dealt with, the manner of presentation, or other factors could not be determined in this study.

7. Most students reacted favorably to the experience of working on the occupational booklets. Of the 284 students in the total subject pool who received the simulated problems, 204 requested to work on other problem-solving occupational booklets.

Part II:

Chapter 1. Simulated Work Experience: An Attempt to Encourage Career Exploration

The purpose of the study was to test two alternative ways of stimulating non-college bound youth to begin exploring career opportunities. Fifty-five non-college bound eleventh-grade males were randomly assigned to either (1) a problem-solving simulated occupational experience in appliance service or (2) a non-problem-solving general career kit. Subsequently, participation of the students was tallied on five behavioral criterion measures: (1) the mailing in of a post card requesting a book on careers; (2) the copying of addresses where further information could be obtained; (3) sign-ups to see a school counselor; (4) written expressed desire to use other booklets similar to that received; and (5) actual use of booklets when made available. Statistical analysis of differences in proportions yielded no significant differences at the .05 level. The two approaches were not found to differ from each other in their ability to inspire career exploration.

Chapter 2. An Optimal Grade Level for Career Exploration

At what grade level will high school students be most likely to engage in career exploration? Within grades nine, ten, eleven and twelve of one high school, two classes were randomly drawn from a pool of "Track 2" English classes. These students spent one class period taking either (1) an experimental booklet designed to provide a simulated experience in solving law enforcement problems (Police

Officer Kit) to promote their occupational information-seeking or (2) a control programed booklet in statistics. Criterion measures assessed relevant information-seeking behaviors. Eleventh-grade students tended to seek more information than students in any of the other three grades, but differences between experimental and control groups were not significant.

Chapter 3. Vocational Information-Seeking Behavior as Affected by a Problem-Solving Work Kit and Set Establishment

Will a problem-solving simulated work kit, a vocational advance organizer or the combination of the two generate more vocational information-seeking than irrelevant control material? The Ss were 85 sophomore students drawn from "general" English classes. The criterion measures were behavioral responses such as signing up to see a counselor or use another work kit, sending a post card for vocational information and copying addresses for further information.

Less than 34 percent of subjects made any responses to the criterion measures. Three chi-square analyses were computed to determine the post-treatment differences between the four conditions. Two statistically significant chi-squares were obtained ($p < .05$) indicating that exposure to the work kit with pre-organized information and work kit alone generated more information-seeking responses than did irrelevant control material alone. A majority of Ss exposed to the work kit indicated they enjoyed working with the material.

Chapter 4. Simulated Work Experience: How Realistic Should It Be?

One hundred tenth grade non-college bound students were randomly assigned to receive two alternative types of materials: (a) experimental: an Electronic Technician Kit which required students to use an actual ammeter in solving problems representative of that occupation; (b) control: a kit virtually identical with the experimental treatment except that no meter was provided. The experimental subjects reported more enjoyment, wanted more information about an electronic technician career, wrote more questions about careers and signed up to take more additional career kits than did the control subjects. However, the number of measured exploratory activities during the week after the treatments was too small to test for statistical significance.

Part III: Orienting Stimuli in Vocational Problem-Solving as Factors in Promoting Career Information-Seeking

Background

In order to find means of encouraging young people to take advantage of occupational information and job training opportunities, to pursue useful occupations, and to see work as sets of interesting problems to be solved, a series of life-like problem-solving experiences related to particular occupations was developed and tested at Stanford University. It was hypothesized that students who were given an opportunity to solve simulated vocational problems would explore career information and engage in interest-indicative activities more than would equivalent control subjects.

The problem-solving materials for each occupation gave the student background information about that occupation and certain facts needed to solve problems related to the occupation. The student was then presented a series of short, simple problems similar to those solved by members of that occupation. The materials were structured in such a manner that the student was assured of solving successfully the initial problems of the set. These materials showed significant positive effects on occupational information-seeking for some of the groups investigated. The effects, however, were relatively slight considering the quantity and duration of problem-solving experiences in relation to long-term behavioral patterns.

Presented here is an investigation of some variables for orienting and guiding the students' vocational exploration following the application of vocational problem-solving materials.

Objectives

In attempting to promote career information-seeking among eleventh-grade students, guides for gathering occupational information were tested: (1) to determine the effect of giving or not giving students their choices of problem-solving materials, (2) to determine the effect of providing specific or general questions for students to explore after problem-solving, and (3) to determine the effect of notifying or not notifying students that they will be asked questions about information they have collected.

Hypotheses

Three hypotheses were tested:

1. Students who were given their first choices of occupational problem-solving materials will respond more positively on criterion measures than students not given their first choices.

2. Students who are given specific questions comparing the two occupations they studied will respond more positively on the criterion measures than will subjects given general questions about the occupations.

3. Students who are notified that they will be asked to discuss their reactions and findings following problem solving will respond more positively on the criterion measures than will subjects who are not notified.

Subjects

One hundred sixty subjects, 80 males and 80 females, from the eleventh-grade level were used. They included the entire non-college preparatory group for this grade level at the volunteer school.

Method

Subjects were given a list of the seven occupational kits and were asked to indicate the two occupations which they would most wish to try. Eighty students were chosen to receive their two first choices. The remaining students were assigned to a group which did not receive their choices. For each student in the choice group who selected a given pair of occupations, a student of like sex from the non-choice group received the two identical occupational kits provided that he had not indicated either of them as his first two choices. This procedure counterbalanced the occupational experiences in each treatment cell; that is, the same kind and number of kits were used in each cell. A second assignment procedure counterbalanced initial preferences; that is, subjects in each cell selected the same kits as their first choices.

Half of the choice group and half of the non-choice group received specific detailed questions comparing the two occupations. The other half received general questions.

Half of the students who received each type of question were informed that at a specific place and time one week later they would be asked to describe their reactions to the occupational kits and any information they may have found during the criterion period. In fact all subjects received such inquiry, but only half of them were notified in advance.

At the end of the problem-solving sessions, all students were given packets of materials which contained information relevant to the occupations for which they solved problems. Also in the packets were the orienting questions and the notices of inquiry.

Criterion Measures

The following criterion measures were used:

1. Amount of information seeking. Students were presented with a number of standard opportunities to seek further vocational information during the week immediately following the experimental treatment. These were:

(a) An opportunity to mail a post card requesting occupational information requiring the subject merely to affix his name, check occupations of interest, and mail.

(b) An opportunity to request an interview with a special vocational counselor.

(c) An opportunity to use career materials available in the school library.

(d) An opportunity to work with other vocational simulation materials.

A record was maintained of those students who accepted each of these opportunities.

2. Scores on an achievement test constructed to assess knowledge of facts relating to the occupations studied.

3. Information given on survey and self-report forms.

Analysis

Data was analysed separately for the two counterbalanced designs by a 2x2x2x2 analysis of variance, fixed effects model.

Results

1. Subjects who received their first choices of kits (a) sent post cards requesting occupational information, (b) wanted to work on additional problem-solving kits, (c) gave favorable estimates of their future job satisfaction, and (d) reported varied information-seeking activities more than did subjects who were denied their first choices.

2. Subjects who received specific questions comparing occupations achieved higher scores on occupational information tests than did subjects who received general questions.

3. Subjects who were notified of later inquiry achieved higher scores on occupational information tests than did subjects who were not notified.

4. Female subjects (a) sent more post cards, (b) wanted to work on additional kits, (c) gave favorable self-estimates of future job success, and (d) reported information-seeking activities more than did male subjects.

5. Males who received their choices planned to look into job opportunities earlier than did males who were denied their choices. Females responded in the opposite direction.

6. Subjects given their choices but not notified of later inquiry reacted more positively toward the kits, had higher estimates of job success, and better understood job demands than did subjects who

received their choices and were also notified of the inquiry. For those denied their choices, notification of later inquiry produced more favorable responses than no notification.

PART I

DIFFICULTY LEVEL OF SIMULATED VOCATIONAL PROBLEMS IN ENCOURAGING CAREER EXPLORATION

CHAPTER I

PROBLEM STATEMENT, RATIONALE AND REVIEW OF LITERATURE

The Problem

In an effort to improve ways of motivating young people to explore their own career opportunities and see the occupational world as a set of intriguing and enjoyable problems, modifications in the structure and use of simulated occupational problem-solving materials developed in earlier experiments were tested to determine the optimal difficulty level of the occupational problems for students with varying interests and ability levels.

The basic notions in this line of research find a theoretical foundation in the work of D.E. Berlyne (1960, 1965) on the origins of exploratory behavior. Berlyne distinguishes between specific exploratory responses which supply the precise information that the subject finds missing and diversive exploration in which the subject seeks out any stimulation that offers novelty, surprisingness, complexity, change, or variety. The present line of research involves both but is primarily concerned with the specific exploration.

Berlyne found that several variables increase the amount of exploratory behavior. The influence of novelty has been amply demonstrated. Subjects were found to explore an object they had not seen before more than one to which they had been previously exposed. A second influence was complexity. Varied or irregular stimulation generated more prolonged exploration. The effects of both novelty and complexity have been confirmed with both human an infrahuman species.

Berlyne's theory states that "specific exploratory responses, whether unlearned or learned, are likely to result from an aversive condition or condition of heightened drive due to lack of information (subjective uncertainty). Such a condition, which may appropriately be called 'perceptual curiosity' is apt to result from exposure to novel, surprising, highly complex, or ambiguous stimulus patterns" (1966, p.30).

While Berlyne's work has used only the most elementary types of stimulus materials and has involved only minimal criteria of exploratory behavior, the basic ideas can be tested for more complex and important types of human response. In this investigation the condition of heightened drive due to lack of information was created by the experience of exposing the subject to a rather novel and complex problem-solving situation.

The research presented here is an investigation of some subject and treatment variables in using simulated occupational problems to motivate vocational exploration. The specific subject variables of concern in this study were ability and initial vocational interest. The treatment variable studied was the difficulty level of the problem materials used. How important is success in problem-solving? Is it possible that some students might need the reassurance of early success? How will prior occupational interest interact with the effect of the treatment? Could the desired difficulty level be a function of each student's ability level and his initial occupational interest?

One of the first questions asked in this study concerns the optimal difficulty level of the problem. Is it in fact desirable for subjects to attain initial success easily? Is it possible that some subjects would be aroused to explore an occupation more readily if the problem were more difficult? Is it possible that for some subjects a more difficult problem is more stimulating while for other subjects the guarantee of success is more rewarding? Is it possible that making the attainment of success either too easy or too difficult lowers the desire to explore that occupation further? Some evidence supporting the notion of an intermediate degree of complexity is suggested by Berlyne's finding that an intermediate degree of ambiguity generates exploratory behavior more than either an extremely ambiguous or extremely clear stimulus. However, the evidence as to the optimum degree of complexity necessary to stimulate further exploratory behavior has not been investigated thoroughly and has not been investigated with humans in a non-laboratory situation.

Unfortunately, the research and theory in the area of occupational choice itself have not been particularly productive of experimentally confirmable hypotheses.

Review of the Literature

While some confusion exists as to the goals and functions of counseling and guidance (Brayfield, 1963; Miller, 1963), the approach which regards the primary goal of counseling as behavior change seems to be of greatest utility for guidance research and practice (Krumboltz, 1966; Michael and Myerson, 1962). Goals stated in behavioral terms make it possible to verify research hypotheses objectively and to assess the outcomes of counseling practice.

Krumboltz (1966, p.155) lists three types of behavioral goals: (1) altering maladaptive behavior, (2) learning the decision-making process, and (3) preventing problems. This investigation deals with the second and third of these three types of goals, preventing problems due to inappropriate vocational choice by helping students learn part of the decision-making process.

Developing decision-making ability has been advanced as a major goal of counseling by numerous writers in counseling and guidance (Wrenn, 1962; Tyler, 1958; Miller, 1961; Gelatt, 1962; Krumboltz, 1966).

Wrenn (1962) recommends that the major goal of counseling be "increased self-responsibility and an increased maturity in decision-making..." (p.109). Tyler (1958, p.6) sees the role of counseling as facilitating the plans, decisions and choices of students. Miller (1961) defines guidance as "...one of assisting individuals in making plans and decisions" (p.15). Gelatt (1962) interprets the counselor's role as that of helping students learn how to make wise decisions.

Gelatt (1962) suggests that a productive strategy for helping students learn to make wise decisions "would be to utilize decision-making opportunities for developing the student's capacity for subsequent decision-making" (p.244).

Super and Overstreet (1960) point out that "school systems are organized so that some anticipatory or actual vocational decisions have to be made in junior high or high school" (p.11). Utilizing these decision-making opportunities to help students learn to make wise choices is recommended by Krumboltz and Schroeder (1965) who suggest that "an effective way to learn how to make sound decisions within the high school setting is to engage in such a procedure in connection with one's own vocational and educational plans" (p.19).

The general purpose of this investigation is to develop ways of assisting high school students to make better vocational decisions. Decision-making is an important skill, for the pattern of a person's life is shaped by the choices and decisions he makes.

> By a wise choice of an occupation one may find a large share of life's pleasures and satisfactions in his work. . . . The choice of an occupation influences almost every other aspect of life. (Hoppock, 1957, p. 2).

> The choice of an occupation is a critical event in the life of a young person. The decision will effect to a large extent his future activities, his friends, his income, his prestige, his neighborhood, and probably the kind of person he will marry. (Krumboltz and Schroeder, 1965, p. 19).

Relevant information is a necessary prerequisite for the making of a good decision (Cronbach and Glesser, 1957; Gelatt, 1962; Krumboltz, 1966). Generating a list of possible courses of action and gathering relevant information about each feasible alternative course of action are important initial steps in the decision-making process (Krumboltz, 1966). Cronbach and Glesser (1957) speak of the decision cycle as continuously functioning and as always requiring the input of relevant information.

"Students should know how to acquire, interpret and apply vocational information so they will be equipped for the continuous process of career planning" (Baer and Roeber, 1958, p. 4).

The need for vocational planning skills is implicit in the fact that "the average person must expect to work at as many as six different occupations during his lifetime" (Tyler and Sundberg, 1964).

In spite of the importance of vocational choice "most young people make this critical decision on the basis of whim, inaccurate stereotypes, or the suggestion or example of some key person in their lives" (Krumboltz and Schroeder, 1965, p. 19). In a study of ninth-graders Super and Overstree (1960) found that knowledge of duties, conditions of work and other important characteristics of the occupation of preference was limited. Slocum (1965) states that "it seems highly improbable that many occupational choice decisions by adolescents are based on a systematic and objective evaluation of all the relevant factors . . ." (p. 861).

Young people not only have limited information on the occupation of their preference, but also they have little awareness of the range of occupational alternatives available to them.

Hoppock (1957) in summarizing research on the range of occupations in which young persons express an interest states that they "indicate a disturbingly limited range" (p. 4).

> The truth is that interest in a vocation can come only through experience and most youth have not had experience conducive to the development of interests in specific vocationa" (Kitson, 1942, p. 567).

The problem of concern in this investigation is how to expand the student's view of alternatives to enable him to make freer choices and to encourage him to seek and evaluate information to make wiser choices.

Kitson (1942) states that "one duty of the vocational counselor is to help the individual become interested in occupations. . ."(p.567).

Sinick and Hoppock (1961) have called for more experimental research on the uses of occupational information. Inadequate research on the nature and role of exploratory behavior in vocational development has been identified as one of the unresolved research issues in vocational theory (Super and others, 1961).

Rusalem (1954, p. 86) suggests that the most efficient exploratory use of occupational information would be those involving experiences in which the person could be actively engaged rather than the more passive techniques such as readings, movies, visits, etc.

In this investigation the subjects were actively engaged in solving problems which simulated those experienced by workers on-the-job. The problem-solving experience was designed to arouse interest in an occupational field and to motivate occupational exploration.

Correlates of Vocational Choice

Factors influencing career choice have been studied for many years. Studies have examined the personality factors, family factors, socio-economic factors, and experience factors which are correlated with various occupational interests. Most of these studies, however, have been either descriptive studies or correlational studies and therefore cannot identify cause with any degree of certainty. As a result we know many factors which correlate with occupational interests, but we do not know what factors cause them.

"For many years the scientific basis of vocational psychology has been the psychology of individual differences. What has been sometimes called trait theory and sometimes trait-and-factor theory has provided the basic concepts and principal tools of vocational counseling" (Super, 1957, p. 4).

The assumptions underlying vocational counseling have been that various occupations require workers with certain skills, aptitudes, interests, etc., that these requirements can be determined, and that these personality traits can be assessed in individuals in order to match workers and jobs properly.

An effort has been made to identify variables related to certain personality traits and thus to vocational choices. Much attention has been given to early childhood variables related to vocational choice. Birth order was found to be related to occupational selection in studies by Fischer (1962) and Stone (1963).

In her work with eminent scientists Roe (1951a; 1951b; 1953) found that in general her successful groups came from above average socio-economic backgrounds. On the basis of this work she formulated a series of hypotheses about early family influences in career development. These hypotheses have not been borne out by subsequent correlational research such as that by Hagen (1960). Investigations by Switzer, Grigg and Miller (1962) and Utton (1962) failed to support Roe's thesis (Roe, 1957) that the manner in which parents satisfy or frustrate the early needs of the child results in the child's attention being directed toward persons or toward nonpersons which in turn influence his later vocational choice. Roe herself states: "The evidence seems clear, even allowing for the methodological limitations of these studies that the relationship predicted between parental attitudes in childhood and later occupational selection does not hold for individual groups of occupations" (1964, p. 209).

Sostek (1963) reported results of a correlational study which indicated that closer identification of the child with the mother than the father was related to choice of feminine-oriented occupations while greater identification with the father was correlated with choosing masculine occupations.

Socio-economic background has been assumed to be an important factor in generating occupational interest and numerous descriptive and correlational studies have indicated the relationships of socioeconomic factors on educational and occupational choice (Hollingshead, 1947; Clark, 1962; Kahl, 1962; Cirrourel and Kitsuse, 1963; Sewell and Armes, 1966).

Tyler has undertaken a longitudinal study to try to understand the development of interests (1951, 1955, 1959). She found that special abilities seemed to correlate with interest for boys but not for girls.

Activities such as vocational courses, practical learning of vocational skills, visiting factories and other places of business, and bringing into the school setting people involved in various occupations are discussed by Hoppock (1957) as being helpful in developing interests. There has been no experimental research, however, to evaluate the effect of these activities on occupational interest.

Holland (1964) has identified five major research programs concerned with vocational behavior: (1) Super's work on vocational development at Columbia University; (2) Tiedeman's work on career development at Harvard University; (3) Roe's work on vocational choice of Harvard University; (4) Holland's studies of vocational behavior at the National Merit Scholarship Corporation; and (5) Flanagan's studies of vocational behavior at the American Institutes for Research. All five of these major programs of research are correlational studies designed to relate vocational behavior to other data. These studies have not involved experimental controls. In his critical evaluation of these programs Holland stated that "most of the empirical research has been done with atypical samples (eminent scientists, National Merit students), or with samples so small that actual predictive studies of choice or career pattern are not feasible (e.g., Super's career pattern study)" (p. 278).

Generally, the above studies have been concerned with broad environmental factors or general personality characteristics related to vocational choice; they have not been productive in generating experimental research which would describe the events influencing vocational choice.

Vocational Interest As a Personality Trait

The trait and factor theory stressing individual differences, testing and matching of individuals with certain assessed traits to occupations requiring the same pattern of personality characteristic has received the most attention in the last 50 years (Hilton, 1962, p. 291).

> People have been found to prefer, enter, remain in, like and succeed most consistently in occupations for which they have appropriate patterns of traits. The theory of the patterning of aptitudes and interests within individuals and within occupational families and the significance of this patterning for choice, entry, and adjustment are widely accepted and applied by counselors ans psychologists today" (Super, 1953, p. 187).

This view of the occupational choice process has promoted an emphasis on testing, interpreting of test results to students and helping students bring their goals, expressed interests, and self-perceived abilities into line with measures of these same characteristics (Hills and Williams, 1965; Berdie, 1963).

Perhaps the most researched trait in connection with occupational choice has been vocational interest. Because vocational interest is a key factor in this investigation and because the view of interest underlying this study differs from the traditional view of interest as a general, enduring, and stable trait, the subject will be reviewed in detail.

Interests, as expressed directly or as measured by various vocational interest inventories, are known to be correlated with occupational selection (Strong, 1943; Berdie, 1955; Williamson, 1964). Berdie (1955) found that interest was more influential than ability in making vocationally related educational choices.

Vocational interest has been the subject of a great deal of research since E.K.Strong, Jr. demonstrated that occupational choices can be differentiated by analysis of responses to an interest inventory.

While Strong generally writes of interests as acquired early in life as results of successful performance, the consistencies of interest patterns found in his research suggested to him the possibility of interests also having an inherited component (Strong, 1943, 1955). Whatever the effect of experience on the development of interests in the child, the pattern of interests becomes stable and resistant to the effects of training or experience in adult life according to Strong (1955).

The ability of the *Strong Vocational Interest Blank* to discriminate among occupations, its high test-retest reliability over long period of time, and the assumption that it measures interests which are enduring traits motivating behavior have made it and other interest inventories widely used in vocational counseling.

How Well Do Measures of Vocational Interest Discriminate Between Occupations?

The *Strong Vocational Interest Blank* (SVIB), perhaps the most widely used interest inventory and certainly the most researched, was constructed to discriminate between occupations. The SVIB is largely made up of items consisting of occupations, activities and school subjects and permits a choice of one of three responses to each item: "Like," "indifferent," or "dislike." The SVIB was administered to criterion groups representing various occupations. Discriminant analyses were applied to derive weights for each response in the inventory for each occupation on which a scale was to be constructed (Strong, 1943). The ability to discriminate between members of an occupation and individuals not in that particular occupation was obtained as significantly different mean scores for the two groups on the scale for the given occupation. The ability of the various scales of the SVIB to discriminate among criterion groups varies from inability to significantly differentiate between some occupations to high ability to differentiate between other occupations with little overlap (Strong, 1943). It is easy, for example, to differentiate chemists from life insurance salesmen, but chemists and engineers have so many responses in common that ". . .they cannot be distinguished from one another to any great extent" (Strong, 1943). Strong indicates that the failure to differentiate occupations in many cases has been due to "faulty techniques" (Strong, 1943).

The SVIB labels scores A or B+ to indicate pronounced interest in an occupation. On scales for 34 occupations 16 per cent of each occupational criterion group scored below a B+ on the scale of the occupation represented. Sixty-nine per cent had an A rating on the scale representing their own occupations (Strong, 1943; 1955).

Campbell (1963) used data from the SVIB manual and found that on four of the 44 scales an A rating fell within one standard deviation of the mean score made by men-in-general. On 14 of the 44 scales a B+

rating was within one standard deviation of scores made by men-in-general.

In summary it can be said that the SVIB can discriminate between many occupational groups when group means on various occupational scales are used. This ability to differentiate is less pronounced between certain occupations, and for some occupations significant discriminations cannot be made. Even when discriminations can be made, the overlap between the occupations is considerable.

How Consistent Over Time Are Interests Measured Under Similar Stimulus Conditions?

Strong (1955) in a follow up study of Stanford students has reported the mean test-retest reliability for 17 occupational scales of the SVIB over an 18-year period to be .69. Over a ten-year period the correlation coefficient was .71 and for five years .76.

Rank order correlations comparing SVIB interest profiles of the same individuals over different time intervals range from .88 for one year interval to .74 for an interval of 22 years (Strong, 1955).

While the above studies on Stanford students have shown long term stability of scores, there were extreme correlations of -.40 or -.50 between test and retest on the profiles of a few individuals although few correlations were below .60 (Strong, 1955).

Twenty-six per cent of the A scores (high interest in an occupation) shifted to B's or less in the 18-year period, 1931 - 1949 (Strong, 1955).

While the stability of the SVIB was demonstrated on his college sample, Strong (1943) found less permanence of interest with younger subjects. Test-retest correlations obtained on eleven year old boys were .62 for a one-year interval, .51 for a two year interval, and .31 for a three-year interval. For a group of 16 and 17 year old boys the test-retest correlations were .69 for a one-year interval and .57 for a two-year interval. Discussing interest change between ages 15 and 25 Strong (1943) writes, "Roughly speaking, one-third of the change in interest is between 15.5 and 16.5 years, one-third between 16.5 and 18.5 years, and one-third between 18.5 and 25 years" (p. 259).

Hoyt (1960) reported test-retest correlations on 44 scales of the SVIB given to high school seniors who were retested as University of Minnesota seniors. The mean rank order correlations for these 121 males subjects was .61.

Strong (1943) notes a general trend for the percentage of items liked to increase between ages 15 and 25. He acknowledges relative instability of interests up to age 25 after which interests change very little.

Strong's conclusion (1955) that ". . .men's interest profiles do not change very much in adult life" seems justified in general by the data if one defines interest as that which is measured by Strong's instrument. Super and Crites (1962, p. 399) state that change of measured interests are not as common as changes of expressed preferences.

Strong in his writing often speaks of interests as being stable rather than interest scores being stable. He goes so far as to state ". . .the writer (Strong) believes that interests are more permanent than so indicated (by test-retest correlations). He confidently believes that this will be demonstrated when a blank especially designed to measure permanance is employed" (Strong, 1955).

What seems to be established is that the SVIB scores have a high degree of stability over time with the college sample studied by Strong. We may choose to hypothesize that the interest inferred from the score is also stable as Strong apparently does, or we may choose an alternate explanation.

How Consistent Are Interest Measured Under Dissimilar Stimulus Conditions?

While measured interest scores have demonstrated considerable test-retest stability, the same stability does not hold when scores are obtained under different stimulus conditions.

Bedell (1941) obtained 17 occupational interest scores (SVIB) of 141 freshmen women and correlated them with self-estimated vocational preferences of the same individuals. The correlations were not significant. It is interesting to note that Bedell assumed that the self-estimations were poor measures of interest. He stated that ". . .a grave questions is raised toward the validity of educational procedures largely based upon the self-estimated interest of students" (p. 65).

Berdie (1950) noted that expressed and measured interests are far from identical. Strong (1943) summarized various studies correlating measured and expressed interests. He found correlations to be generally in the neighborhood of .50.

Holland (1960) reports 111 correlations relating interests measured on the Holland Vocational Preference Inventory (VIP) to expressed goals and values. Only four of the 111 correlations were as high as .40, the highest being .51.

Older (1944) developed a test of manifest interest which was significantly related to expressed interest but did not correlate significantly with corresponding scales of the SVIB.

Super and Roper (1941) using a test of manifest vocational interest in which subjects were shown slides depicting aspects of various occupations and were later given a recall test found no significant correlation between this measure of manifest interest and the SVIB given to the same subjects.

Clark (1960) described a study in which the social service scale of the _Kuder_ was correlated with the minister scale of the SVIB. The correlation was only .20. This same study found a correlation of .28 between the literary scale on the _Kuder_ and the author-journalist scale of the SVIB.

Super and Moser (1960) took 23 measures of maturity (physical, emotional, and intellectual). They correlated these measures of maturity with the interest maturity scale of the SVIB. The correlations ranged from .01 to .37.

In a study of 94 women undergoing training to become teachers at Teachers College, Stuit (1938) found only 10 of the 94 who scored an A or B rating on the teaching scale of the SVIB.

Correlations between measures of vocational interest and measures of job satisfaction have not been high. Strong (1943) reported correlations of .14 to .38 between the appropriate scale on the SVIB and liking one's work. Berdie (1960) reported studies by Kates and Redlener in which the highest correlation between SVIB score and job satisfaction was .45. Kates (1950) in a study of 100 clerical workers found a correlation of .21 between measures of vocational interest and job satisfaction. Schwebel (1951) reported a correlation between interest and satisfaction of .30 for pharmacists.

Holland (1965) reported correlations of the ten scales of the VPI with a measure of job satisfaction on a group of 124 individuals. The correlations range from -.18 to .26.

Strong (1943) stated, "Interest in an activity is an indicator that performance has been successful. We suspect that people who have the kind of brain that handles mathematics easily will like such activities and vice versa. In other words, interests are related to abilities, and abilities, it is easy to see, can be inherited." (p. 683). If Strong's assumptions are correct, one would expect to find high positive correlations between abilities and interests.

A study by Adkins and Kuder (1940) using the Kuder Preference Record and the Primary Mental Abilities test to investigate the relationship between ability and interest concluded that preference scores did not indicate the presence of absence of special abilities.

Kerr and Willis (1966) using a sample of 2002 males and 814 females from adult evening classes correlated scores on the Primary Mental Abilities test with the Kuder Preference Record. Of the 140 correlations obtained only one was above .30. The following correlations were obtained where high positive correlations would be expected if interest and ability are positively related: Computational interest and number ability correlated .23, literary interest and verbal ability correlated .27, persuasive interest correlated .06 with verbal ability and -.10 with reasoning ability, scientific interest correlated -.04 with verbal ability, .10 with reasoning ability, and .23 with number ability.

Holland (1965) reported correlations between the first six scales of the VPI and self-reported competencies of college freshmen (3771 males and 3492 females). The following correlations between expected relationships were found:

VPI Scale	Self-Reported Competencies	Correlation	
		Males	Females
Realistic	Technical	.36	.25
Intellectual	Scientific	.41	.39
Social	Social and Educational	.37	.33
Social	Leadership and Sales	.29	.24
Conventional	Business and Clerical	.22	.22
Enterprising	Business and Clerical	.26	.20
Enterprising	Social and Educational	.30	.26
Enterprising	Leadership and Sales	.35	.29
Artistic	Arts	.51	.45
Artistic	Foreign Language	.18	.16

Berdie (1960) as the result of his review of the research on vocational interest since 1950 concluded that, "The consistently low but sometimes significant relationships found betwen SVIB scores and academic and training grades lead inevitably to the conclusion that there is a slight relationship betwen interest scores and grades but that the size of this relationship is such that it seems little use in making predictions and accounts for little of the variance in academic success" (p.42).

What is the Predictive Validity and Utility of Vocational Interest Measures?

The above studies have indicated that vocational interest measures have slight value as predictors of job satisfaction or ability. How well do vocational interst measures predict entry into an occupation?

In Strong's study (1955) of men over an 18-year period, he found that 44.6 per cent of the 663 men got A ratings in 1931 on the scale of the occupation in which they were later employed in 1949. If college students scored an A in only one occupation, which is not the case, and if Strong's findings still held true, one could expect to successfully predict occupations from SVIB scores nearly half of the time. The problem of prediction is complicated by the fact that the average male has 1.48 A ratings per ten scales on the SVIB which means he has 5 or 6 A's on the currently used SVIB. Even if one could successfully predict occupations from SVIB scores 40 per cent of the time, the achievement would not present greater predictive validity than can be obtained at less cost of time and money. Fifty per cent of Strong's Stanford group selected as freshmen what proved to be their final occupation. In other words if predictions had been made using student's announced vocational choice, the predictions would be better than those which could have been made using the Strong.

A study by Wightwick cited by McArthur and Stevens (1955) found that SVIB predicted post college occupations slightly better than expressed interests at the college freshmen year but the reverse to be true by the senior year.

In a similar study McArthur and Stevens (1955) compared vocational predictions based on SVIB scores taken on 60 Harvard sophomores in 1939-40. Expressed interests turned out to be slightly but significantly more valid than the same men's inventoried interest scores in predicting these men's actual occupations in 1953.

Holland and Lutz (1967) reported a study comparing the use of the Holland VPI with expressed vocational interests in predicting later vocational choices. They found that asking a student about his first two vocational choices was almost twice as efficient as the Vocational Preference Inventory in predicting vocational choices.

Are There Alternative Assumptions Which May Better Fit the Data From Vocational Interest Research?

What might account for the ability of vocational interest tests to discriminate between occupations, for the stability of scores on the same measure over time, for the degree of validity obtained in predicting occupations, and for the lack of consistency between measures of vocational interest under different stimulus conditions?

Bordin and Wilson (1953) write that in answering a vocational interest inventory ". . .an individual is expressing his acceptance of a particular view or concept of himself in terms of occupational stereotypes" (p. 297).

Grunes (1957) and Holland (1964) have shown that people tend to see occupations in stereotyped ways. Bordin(1943) found that a group was able to fake high scores in an occupation by responding to the inventory as they pictured a stereotype would. Kirschner (1961) summarized a number of studies which indicate that persons can fake the SVIB rather effectively when directed to do so.

Consistency over time on a measure of interest might be in part due to the consistency of the vocational stereotype or the consistency of the constructs one has about himself rather than a consistency of a particular set of interests. Do subjects reveal a subconscious occupational interest by indicating their interests in the test items or does conscious vocational preference determine that the inventory will be answered in accord with the subject's stereotype of the occupation.

Bordin (1943) indicates that a person can respond to SVIB items in such a way to express a vocational stereotype he possesses.

Strong (1943) describes homogeneity of interests among members of an occupation as dependent upon the length of training required. The variance of scores for physicians on that scale of the SVIB is small while the variance of scores for realtors is great. One might hypothesize that the long training of doctors has given them a clearer concept of their occupation and therefore in responding to the SVIB in terms of the construct "physician" there is close agreement among doctors. Realtors on the other hand vary a great deal in both the length and nature of their training and thus perhaps have less well defined constructs about the occupation and reveal wider dispersion of scores on the realtor scale.

Intelligence may account for some of the consistency found in interest scores. Stewart (1947) found a clear occupational hierarchy with respect to Army General Classification Test Scores when total scores were considered. The overlap between occupations was great, but one wonders whether or not discriminant analysis of the test items could not be done which would further differentiate between occupations in the same manner as was done in the development of the Strong. A study by Wrenn (1932) found that students with very high intelligence test scores are more apt to have Strong Blank A's in scientist occupations.

Bordin and Wilson (1953) suggest that the investment in an occupational goal accounts for the stability of interest with age.

Response sets have been described by Berdie (1943) as possibly contributing to consistency in scores. Responding "like" to all items elevates the social service and business detail scores while responding "dislike" to all items boosts technical and scientific scores.

While the predictive validity of the SVIB was no greater than expressed vocational choice, the validity that was achieved was questioned by Berdie (1960) who suggested that eventual choice of an occupation in Strong's 18-year study was contaminated by the use of SVIB scores to counsel the students in the study. Some vocational choices may have been influenced by test scores.

Interest trait assumptions do not seem to be productive for vocational counseling. Some alternate assumptions suggested here are as follows:

1. Interests arise out of satisfactory experience in specific circumstances and may generalize.
2. Interests depend upon life contingencies and are thus subject to change throughout life.
3. Expressed vocational preferences and inventoried vocational interests differ in that while both are expressions of vocational preference, inventoried interest is expressed in terms of an individual's constructs of the occupational stereotype. The more closely one's stereotype conforms to the stereotype held by members of the particular occupational field the closer will be the relationship between one's expressed and inventoried interest.
4. The consistencies found in inventoried interest measured by the same instrument over time is due in part to the consistency of the occupational stereotype.
5. The instability of interests measured under dissimilar stimulus conditions reflect the fact that interests are not independent of environmental contingencies. One may like to read under certain circumstances but never read under other conditions. If interests are specific, one would not expect interest in an occupation to necessarily mean more interest and better performance in courses leading to that occupation.

If interests arise from specific experiences and are changing throughout life, an approach to vocational counseling more productive than trying to assess an individual's traits in order to match the fixed set of traits to jobs with stable requirements might be to provide vocational experiences which would help generate and define vocational interests.

Influence of Experience on Occupational Interest

Kitson (1925) and Overstreet (1957) have stated that vocational interests are largely influenced by experience. The bulk of the evidence which support this is descriptive or correlational in nature.

Roe (1956) in summarizing the studies which have attempted to identify sources influencing vocational interest and occupational choice listed parents, other relatives, friends, teachers, and people in the vocations as the most important influences in occupational selection. Nothing in these studies indicates what these people did or how their influence was exerted -- the crucial focus of this investigation.

Dole (1961) in his study of 22,810 Hawaiian students in the sixth, ninth and twelfth grades, and freshmen and senior classes in the University of Hawaii found that boys most often mentioned work experience and friends as being influential in their vocational decisions. Girls most frequently listed the influence of parents, friends, and work experience in that order.

Morton (1953) found significant positive relationships between high school jobs and adult vocations, but Lyon (1959) could find no association between summer work experiences and adolescent vocational choices.

Bateman (1949) paired a group of high school students holding part time jobs with a similar group but not holding jobs. Analyzing the

Kuder Preference Record administered to subjects in both groups, Bateman concluded that working and nonworking students do not differ greatly in their interest patterns.

Although the studies above suggest that experience is an important influence on vocational decision, Davidson and Anderson (1952) reported that youths from lower class families have a more limited range of occupational experiences than those from the higher socio-economic strata. They surveyed seven per cent of the employed males in San Jose, California to find the work history of these men including part-time high school jobs. The men were grouped according to the occupational level of their fathers. The early work experience of those whose fathers were unskilled were generally restricted to farm labor, unskilled cannery work, or casual labor. These men generally were employed at unskilled or semiskilled jobs when interviewed. While some of those whose fathers were skilled or professional workers also reported farm labor experience, selling, messenger service, and building trades experience were more often reported in these groups than among the unskilled. In describing the work histories Davidson and Anderson (1952) note a "pattern indicating a class-like tendency from skill status of fathers to that of sons" (p. 404).

Work opportunities offered by the community do not seem to present the variety of occupational experiences necessary to introduce young people to the wide range of vocational alternatives open to them or to become the bases for occupational interests and career decisions. For this reason this present investigation is concerned with improving ways in which a variety of occupational experiences can be offered young people through simulation.

Krippner (1962) concluded from his studies of part-time jobs of students that even at the upper end of the social scale, the culture does not provide junior high school boys enough opportunity to obtain information about possible occupations. Using a sample of 189 boys and 162 girls from the seventh and eighth grades in a junior high school serving an upper-middle class suburban Chicago community, Krippner found that 53 per cent of the boys and 36 per cent of the girls had some work experience. More girls than boys claimed to have had occupational experiences in their chosen occupational field. The majority of the boys' work experiences involved delivering newspapers, mowing lawns, raking leaves, shoveling snow, washing cars and baby sitting which had little in common with the vocational preferences expressed by a majority of these boys.

That students would welcome work experience is demonstrated in a survey by Lowe (1963) in which 3,195 students in grades eleven and twelve in Salt Lake City, Utah were asked if they would be interested in taking a course in school which would allow them to gain work experience while attending regular classes. A total of 81.5 per cent of the sample indicated they would like such experience.

The Development of Vocational Interests

A great deal of attention has been given to determining when vocational interest develops. Ginzberg (1951) and Super (1951) hold a developmental view that in early adolescence children achieve a readiness for vocational exploration and later acquire the basis for realistic occupational choice.

Ginzberg's theory (Ginzberg and others, 1941) of occupational choice as a developmental process, largely irreversible, was based on a descriptive study of male subjects between the ages of 11 and 24 from upper middle-class families. A sample of eight subjects was drawn from each of the age groups studied. From this relatively small sample Ginzberg described three periods in the process of occupational choice: (1) fantasy, (2) tentative, (3) realistic. The process is described as taking 8 - 10 years with the realistic choice period beginning at about age 17.

Both Super (1951 and Ginzberg (1951) stress the need for early exploration of vocations so that there is a basis later for realistic choice.

Super and Overstreet (1960) recommended that ninth-grade boys "be given a broader perspective on the world of work . . . This early adolescent stage is one, not of making and implementing a vocational choice, but rather of developing planfullness, of preparing to make a series of educational and occupational decisions" (pp.152-4).

Gribbons (1964) reported interviews with 111 boys and girls in the eighth grade and again two years later in the tenth grade. This study supported the developmental view and found that students increased in their awareness of interests and values and their relation to occupational decisions. As tenth-graders, they were more willing to take responsibility for their decisions and had increased in awareness and accuracy in the appraisal of their abilities. While the study described the results of an apparent learning process, it shed no light on the contingencies which promoted this kind of learning or development.

Ginzberg (195), Hoppock (1957) and Super (1960) have investigated occupational selection and concluded that many choices are made at the early adolescent level. Confirming this view, Parker (1962) found that in a study of 29,000 seventh graders in the State of Oklahoma fewer than 10 per cent described themselves as lacking vocational goals.

Super (1953) states that vocational preferences "change with time and experiences but are fairly stable from later adolescence until later maturity" (p. 189).

Schmidt and Rothney (1955) studied the vocational choices of 347 high school students and found that two out of three students changed their choices at least once in high school. One of five expressed the same choice all the way through school and followed through into post-high school vocational activity. No indication was given as to the conditions which promoted choice stability or instability in this descriptive study.

Interest Change

Many writers assert that vocational interests are largely the result of experience (Overstreet, 1957; Kitson, 1942; Slocum, 1965; Bordin and Wilson, 1953; Strong, 1943).

Kitson (1942) suggests that students lack vocationally related experiences upon which to base interests. He asks, "Are we not on the wrong track, then, in spending our time probing within Johnny for vocational interests that are not actually there?" (p. 567). He recommends that vocational counseling time be better spent in helping the individual become interested in occupations. Slocum (1965) asserts that "insofar as possible young people should be assisted to have work experiences that will provide an opportunity for real testing of presumed occupational interests and aptitudes" (p. 861).

Rusalem (1954) suggests that

> . . .the most efficient use of occupational information in an exploratory sense would appear to be in those experiences which involve most nearly the whole person. If such is the case, more passive techniques such as readings, movies, visits and the like are less satisfactory than more active approaches (p.86).

Overstreet (1957) agrees that vocational interests are largely the result of experience, feeling that work experiences can be a major influence upon career preferences.

In spite of the general agreement on the view that experience gives rise to interests, interest has been studied more as a cause of behavior than as a result of behavior. Krumboltz (1966) suggested that "it seems more plausible that positive feelings are the by-product, not the cause of competent behavior and the rewards it brings" (p. 158).

Some support for this notion is given in a correlational study (Bordin and Wilson, 1953) in which a sample of Washington State College freshman males were given the Kuder Preference Record (Form BB) in September and again in April of the same school year. The sample was divided into two groups. In Group I were students whose initial tests were consistent with their initial choice of vocation. Group II was composed of students whose initial test scores were inconsistent with their initial vocational preference. It was hypothesized that students in Group I who remained in a curriculum consistent with initial measured vocational preferences and students in Group II who during the year changed to school programs which were consistent with initial test results would exhibit greater stability between the two test measures than those students who either continued in or changed to a program which was inconsistent with the initial measured preferences. It was further hypothesized that in the less stable group the direction of the change in measured interests would be consistent with the curricular shift. Both hypotheses were supported. The finding that students who continue in a curricular choice in spite of contrary interest patterns will show modifications of their interest patterns in the direction of their curricular experience "should give pause to those counselors who are inclined to interpret interest tests as evidence that students should change their curricular orientation" (p. 306). While due caution must be taken in interpreting this correlational evidence, it does suggest that interests may be modifiable even during late adolescence when according to Strong (1943, 1955) interests become stable.

Exploratory Behavior

A need for research on the nature and role of exploratory behavior in vocational development has been identified (Super and others, 1961).

Harlow (1953), Montgomery (1954) and Berlyne (1960) hypothesize the existence of an exploratory drive.

Montgomery (1954) in research with rats found evidence that novel external stimulation evokes exploratory behavior.

Berlyne (1965) states that

> . . . When drive or arousal is driven upward by an encounter with an exceptionally novel, surprising, complex, or puzzling stimulus pattern, exploratory behavior is likely to supervene, and the intensification of stimulation and accrual of information that results serve to bring the drive down again. This reduction in drive (perceptual curiosity) may provide reinforcement facilitating the retention of the information in question and strengthening the subject's inclination to engage in exploring activity in comparable situations (p. 253).

For Berlyne (1960), conflict is the important determinent of exploratory drive. He postulates the existence of an exploratory drive which is aroused when the individual experiences perceptual or conceptual conflict and is reduced if resultant exploratory responses obtain additional information about the environment. Exploratory behavior enables the individual to receive information not previously available to him, and this information is pertinent to the making of certain decisions which will resolve persisting conflicts.

Summarizing his studies Berlyne (1965) finds that the major determinants of specific exploration are "a group of stimulus properties to which we commonly refer by such words as 'novelty', 'change,' 'surprisingness,' 'incongruity,' 'complexity,' 'ambiguity,' and 'indistinctness'" (p. 245).

Berlyne (1954, 1957, 1960) has identified experimentally some of the stimuli characteristics which elicit exploratory responses. Presenting stimulus patterns on cards or by a tachistoscope he found that subjects free to examine each pattern as long as desired spent more time viewing stimulus figures which exhibited any of these four properties: incongruity, complexity, surprisingness, and irregularity.

Berlyne (1954a, p. 180) distinguishes two types of curiosity, perceptual curiosity is a drive which is reduced by increased perception of stimuli; and epistemic curiosity a drive which is reduced by the acquisition of knowledge.

Berlyne (1954a) suggests that the desire aroused by questions is a form of epistemic curiosity.

> Both introspective and behavioral evidence reveal that, when the acceptable answer to a question has been encountered and rehearsed, curiosity is reduced to subthreshold value. But the higher the drive before such reduction the greater the amount of reinforcement" (p.183).

Berlyne (1954a, 1954b, 1960) has reported a series of studies on epistemic curiosity. An experimental group was given some questions on invertebrate animals to respond to prior to having an opportunity to obtain the information necessary to properly answer them. The information was then presented to the experimental group and to a control group who had not been presented with the prior questions. Finally all subjects were given a post-test which included all pre-test questions randomly arranged. The experimental group correctly answered significantly more than the control group.

Mittman and Terrell (1964) in a study designed to test Berlyne's epistemic curiosity formulation presented size and form tasks to 42 first and second grade school children. The subjects were randomly assigned to three groups and the task presentation to each group was varied with respect to the level of epistemic curiosity aroused. To manipulate the curiosity level, a sample of the completed task was presented before the first trial to the low curiosity group. A semi completed task was presented to the moderate curiosity group, and no clues at all were given the high curiosity group. The high curiosity group made significantly fewer errors than did either the moderate or low curiosity groups.

Berlyne (1957b) has hypothesized that drive arousal, "risk-taking" or "problem-solving" may be rewarding at a moderate level but "such states as fear or conflict are sought only when their arousal in similar circumstances has been reliably and speedily followed by drive reduction in the past" (p. 337).

Hebb (1955) refers to "the positive attraction of mild fear, and of problem solving, or mild frustration" and hypothesizes that "when arousal or drive is at a low level . . . a response that produces increased stimulation and greater arousal will tend to be repeated" (p. 250).

Brayfield (1948) quotes Carl Rogers as postulating that "counseling can be of help only when there is a certain amount of psychological distress." Brayfield goes on to say that "we have been forced by parents and administrators to provide psychological distress to get them (students) thinking about vocational choice" (p. 493).

Jordaan (1963) defines vocational exploratory behavior as

> . . . activities, mental or physical, undertaken with the more or less conscious purpose or hope of eliciting information about oneself or one's environment, or of verifying or arriving at a basis for a conclusion or hypothesis which will aid one in choosing, preparing for, entering, adjusting to or progressing in an occupation: (p. 59).

Studies at Stanford University (Krumboltz and Thoresen, 1964; Krumboltz and Schroeder, 1965; Krumboltz, Thoresen and Hosford, 1966) have experimentally tested the effectiveness of reinforcement counseling, modeling, and combined model-reinforcement counseling in increasing the vocational exploratory behavior of high school students. The results of these experimental studies indicate that vocational exploratory behavior can be influenced by reinforcement and modeling techniques.

Simulated Occupational Experiences

Simulation has been used to solve design problems in industry, to help develop a body of knowledge of complex social institutions, to train and to teach (Dawson, 1962, p. 5).

> One of the advantages of simulation is that it permits the experimenter to study processes in ways that nature prohibits. The simulation can be run many times with the values of the parameters being modified between runs and changes in output

> observed. The experimenter exercises a great deal of control (Dawson, 1962, p. 12).

Gaming, one form of simulation, has been of interest to social scientists. Martin (1959) defines a game as "a technical term denoting a simulation in which the results for one group depend upon the actions of their competitors" (p. 101). Simulation games have been developed in three main areas: (1) war games, (2) business or management games, and (3) political games (Dawson, 1962, p. 10). The major purpose of these games has been to teach principles, strategies, and decision-making.

> The central problem inherent in all simulation processes and in all model building as well is that of adequate reproduction of the real system (Dawson, 1962, p. 13).

Kitson (1942) reported on a project by L.J. O'Rourke in which a series of short work experience problems in several occupational fields were developed for use with elementary, junior high and high school age boys. Setting up a two-way buzzer system and wiring a model house-to-garage wiring system were given as examples of the more than 1,000 projects developed by Dr. O'Rourke.

Students were given a series of projects in a given field beginning with a simple problem and progressing to more complex ones. The last project in each series was presented for solution without the detailed pictorial and written instructions which had accompanied the previous projects. In a rather informal evaluation of the results of using these projects Kitson (1942) reports that prior to working on the projects students were presented a list of activities available in the project kits and asked to indicate those items they would and would not enjoy. Each student was subsequently assigned to three projects in each field including some which students had anticipated not enjoying.

Alternate forms of the preference list were used following the project experiences. Comparisons of pre- and post- forms ". . .invariably shows marked contrasts in some fields, and indicated that the youth has developed new interests by exerting activity" (p. 509).

No statistical data or analysis was reported, but Kitson (1942) concluded that the "favorable attitude toward the activity was probably the glow of feeling (Thorndike's Law of Effect) that accompanied successful completion of the work" (p. 569).

Sheppard (1967) reported an experimental study conducted in 1965 which compared the use of problem-solving booklets which simulated problems experienced in the field of accounting with information-only booklets in accounting and with general career information booklets for 540 eleventh-graders. The subjects were randomly assigned to treatment groups and given one of the three booklets to work on in the 50-minute period allowed for the treatment. Criterion measures were taken one month following the treatment.

Subjects in the problem-solving and accounting information groups reported a greater interest in the field of accounting than did the general information control group.

The problem-solving treatment stimulated more career relevant information-seeking than the other two procedures for only half of the subgroups identified. This significant interaction needs to be replicated to confirm the type of subjects most affected by the problem-solving procedure.

Interest in accounting as measured by items from the accounting key of the Kuder Form D was not differentially affected by the treatments.

Among subjects from the three groups who requested counseling interviews following the treatments, accounting was the occupation most frequently inquired about even though no one from the general information control group did so. Subjects from the problem-solving group asked the type of questions rated as most specific. This study by Sheppard appears to be the first experimental research attempting to create an occupational interest.

A study by Jones (1966) used film presentations of problem-solving situations in banking to motivate interest in vocational exploration. A total of 270 tenth-grade high school students were randomly assigned to experimental and control treatments. Experimental groups watched a film on banking in which problem situations were presented for subjects to solve. Some control groups watched similar films but without the problem-solving opportunities. Other controls used printed materials rather than films.

The experimental films as a group were more effective than the group of control materials in influencing subjects' expressed and inventoried interests in banking occupations but not their subsequent vocational exploratory activities. Neither group of materials was significantly superior on the latter dependent variable.

Subjects who viewed the two active-participation films scored higher on the dependent variables of expressed and inventoried interests than did those viewing the passive experimental films.

An investigation by Krumboltz (1967) experimentally tested occupational problem-solving materials simulating problems in sales, medical laboratory technology and X-ray technology with 561 tenth grade high school students from two high schools, one located in a neighborhood of middle to upper-middle class families and the other in a less economically privileged area.

Subjects were randomly assigned to experimental and control treatments. Experimental treatment booklets presented subjects with problems typically solved each day by workers in the particular occupation, gave subjects the information necessary to solve the problems, virtually guaranteed the students would be successful in solving this first problem in that occupation, and indicated to them whether or not their solutions were correct. Control groups were given booklets which presented similar information but without problem-solving, booklets with general career information, or booklets with materials unrelated to occupations. Criterion measures were taken one week following treatments.

Subjects were given post cards addressed to the investigator on which subjects could request occupational information. Receipt of post cards was used as one criterion measure. Subjects from the suburban, middle to upper-middle class high school responded less than did subjects from the lower socio-economic high school. This corresponds to the findings in the banking study (Jones, 1966) which reported similar results. In the less economically privileged high school more subjects from the problem-solving treatments sent post cards requesting occupational information than did those in any one of the nonproblem-solving, information only, or other control groups. The effect did not hold in the middle class high school.

Analyses of other criterion measures, self-report of occupational interest and information-seeking, revealed that some of the problem-solving materials did have significant positive effects on career exploration activities for some of the groups investigated. The effects, however, were relatively small as would be expected for a treatment lasting less than 50 minutes and attempting to modify a major behavior pattern. Subjects from the less privileged community responded more favorably on most criterion measures and among these students, the problem-solving experiences had a more positive influence with boys than did the control materials.

The report of the study (Krumboltz, 1967) suggests that the phenomena was complex and many specific variables involved need to be investigated. Among the variables of concern were subject variables, initial occupational interest patterns and academic ability levels, and treatment variables, one of which was the level of difficulty in achieving success in the solution of the presented simulated problem. The problem-solving experiences used in the Krumboltz study were designed virtually to guarantee that the subjects would successfully solve the problems. The booklets were distributed to students randomly with each subject receiving a booklet on an occupation with no concern for the subject's initial occupational interest.

What effect does initial occupation interest have on the effectiveness of simulated vocational problem experiences? How difficult should it be to succeed in the problems? Could the desired difficulty level be a function of each student's ability level and his initial occupational interests?

The answers to these questions are essential in the development of materials best suited to encouraging young people to explore realistically the career opportunities available to them.

In writing of the effect of difficulty level of problems, Berlyne (1965) states that "it is not so that we are more likely to start thinking about a problem the more difficult the problem is" (p. 290). He continues:

> It seems that difficulty . . . works in two opposite directions. The more difficult the task, the greater the satisfaction (in conflict reduction, in heightened self-esteem, and in social acclaim) to be gained from success, which favors undertaking it. At the same time, the more difficult a task, the more stress and frustration it is apt to generate and the greater the chance of failure, which militates against undertaking it. The subtle interaction between these two factors must determine where the preferred level of difficulty lies (p. 292).
>
> The major condition for activating exploration of alternatives in a task is the presence of some optimal level of uncertainty . . . . The maintenance of exploration, once it has been activated, requires that the benefits from exploring alternatives exceed the risks incurred (Bruner, 1964, p. 309).

Keister (1943) reporting on a study of the behavior of children in failure suggests that success in solving easy problems probably encourages interest; that a period of preparation in which relevant information and skills are acquired will probably facilitate attempts to solve problems, and that the effects of failure are likely to be minimized if students are presented with problems graded in terms of difficulty.

In Keister's study, subjects learned to persist in problem-solving by having success at problems leading up to the difficult one. The same technique was used in this present study. Easy practice problems were first introduced and were followed by more difficult simulated occupational problems.

SUMMARY

The majority of the studies related to vocational choice have been correlational; few, if any, have been carefully controlled experimental investigations. What are the factors which influence occupational choice? Unfortunately most of the evidence that can be brought to bear on this question is descriptive or correlational in nature. We can describe the traits, characteristics and behavior patterns of people currently engaged in each of a number of occupations, and we can relate stated interests in these occupational areas with reported or observed traits and behavior at earlier periods of time, but such descriptions and relations do not enable us to make a conclusive assertion as to what caused the interest to develop in the first place. Consequently, although counselors and vocational education teachers know many factors related to vocational choice, they know for sure very little that they themselves can do to encourage young people to explore career opportunities more thoroughly. Procedures which provide young people with a realistic occupational experience and which stimulate them to explore their own career decisions deserve the highest priority.

The Stanford research on the use of simulated vocational problems to motivate vocational interest and exploration has been the first to explore experimentally some of the factors believed to cause occupational interests to develop. Before the results of this research can be effectively applied by counselors and teachers of vocational education, much more needs to be known about how important subject and treatment variables affect the outcomes of this problem-solving approach to the generation of vocational interest and the motivation of occupational exploration.

CHAPTER II

EXPERIMENTAL DESIGN AND PROCEDURE

Overview

The major purpose of this investigation was to learn how simulated vocational problem-solving experiences could best be adapted for different individuals to motivate vocational interest and exploration. One treatment variable, difficulty of achieving success, and two subject variables, ability and initial vocational interests were studied.

Simulated vocational problems in the areas of sales, X-ray technology, and medical laboratory technology which had been developed in previous research (Krumboltz, 1967) were modified so that each could be presented at three levels of difficulty to determine the optimal difficulty level of the occupational problems for students with varying occupational interests and abilities.

In previous research using simulated occupational problems (Jones, 1966; Sheppard, 1967; Krumboltz, 1967) the problems to be solved were made easy enough so that 75 per cent or more of the high school subjects could successfully solve them. The assumption was that a successful occupational experience would motivate interest and exploration in that occupation or in other occupations.

Berlyne (1965) has pointed out that an optimal difficulty level needs to be determined in order that difficulty of the problem minimizes the effect of success without unduly increasing the chance of failure which may work against undertaking the task.

This study experimentally tested the effectiveness of simulated vocational problems in sales, medical laboratory technology and X-ray technology in generating vocational interest and motivating occupational exploration. The difficulty level of the problem-solving materials was systematically varied so that the materials could be presented making success difficult, moderately difficult, or easy to achieve. The effects of these varied difficulty levels were studied with ninth-grade and eleventh-grade boys of high, medium, and low academic ability having various types of initial occupational interest. Self-report of interest in learning more about various occupations, a test of knowledge of occupational information in the three vocational fields used in this study, and a record of incidents of occupational information-seeking were used as criterion measures.

Statement of Hypotheses

The following directional hypotheses were tested:

I. Students receiving a problem-solving kit in which success is moderately difficult to attain will indicate more interest in the vocation studied than will students receiving a problem-solving kit in which success is difficult or easy to attain.

II. When occupational information is made available, students receiving a problem-solving kit in which success is moderately difficult to attain will gain more knowledge of the occupation studied than will students who receive kits in which success is difficult or easy to attain.

III. Students receiving a problem-solving kit in which success is moderately difficult to attain will take advantage of more opportunities to seek further vocational information following the experimental treatment than will students who received kits in which success is difficult or easy to attain.

These hypotheses are consistent with Berlyne's suggestion (1965, p. 292) that the preferred level of task difficulty lies in an area between two extremes in which the difficulty level is great enough to result in satisfaction in the accomplishment of the task yet not so difficult as to discourage undertaking it.

The following non-directional hypotheses were also tested:

IV. The difficulty level of the problem-solving kits will interact with ability level of subjects on all criterion measures. While available information was insufficient to make it possible to predict the exact nature of this interaction, that students of high, middle, and low ability would respond differently to the difficulty level of a problem seemed to be a reasonable assumption.

V. The difficulty level of the problem-solving kits will interact with initial occupational interest as measured by the Holland Vocational Preference Inventory on all criterion measures. The precise nature of this interaction could not be predicted in advance though it seems reasonable that students with certain initial interests (e.g., intellectual) might respond more positively to a difficult problem than those with other interest (e.g., social). The specific occupation represented might also affect the interaction.

These interactions of difficulty level with student grade and ability levels and with type of initial occupational interest were of special concern in this study. These first, second, and third order interactions were tested as null hypotheses.

Using the number of post card requests for occupational information as a criterion measure in this experiment permitted a partial replication of a previous study (Krumboltz, 1967) which used the same problem-solving booklets and the same criterion measure. The previous study differed in that all problem materials were at a level of difficulty comparable to the easy presentation in this investigation.

In an attempt to confirm the efficacy of simulated occupationaal problems in motivating vocational information seeking reported in the Krumboltz study (1967), the following hypothesis was tested:

> VI. Subjects having worked on simulated occupational problem-solving booklets will send more post card requests for occupational information than will control subjects having worked with general occupational planning material.

Subjects

The experiment was conducted at Andrew Hill High School which is one of six high schools in the East Side Union High School District of San Jose, California. Andrew Hill was chosen because it serves a working to lower-middle class community, and previous studies with these occupational problem materials (Krumboltz, 1967) have shown them to be most effective with students of this socio-economic background. Approximately 25 per cent of the school population is Mexican-American.

The subject pool included all eleventh-grade boys (N = 183) in the school. An approximately equal subject pool of ninth-grade boys was obtained by randomly selecting ninth-grade social studies classes until 194 ninth-grade boys were obtained. Approximately four-fifths of the ninth-grade boys were in the subject pool.

Prior to the experimental treatments, grade point averages for the first semester of the current school year were computed for each individual in the subject pool. A frequency distribution of grade point averages was made, and the subjects at each grade level were divided into three groups according to grade point average in a manner which most nearly equalized the size of each subgroup. This division into ability groups is illustrated in Tables 1 and 2.

TABLE 1

NINTH GRADE ABILITY GROUPS BASED ON GRADE POINT AVERAGE

Ability Group	Range of GPA	Mean GPA	Number of Subjects
Low	.03 - 2.00	1.72	62
Middle	2.17 - 2.50	2.30	53
High	2.67 - 4.00	3.10	60
		Total	175

TABLE 2

ELEVENTH GRADE ABILITY GROUPS BASED ON GRADE POINT AVERAGE

Ability Group	Range of GPA	Mean GPA	Number of Subjects
Low	.67 - 2.00	1.65	56
Middle	2.17 - 2.50	2.34	51
High	2.67 - 4.00	2.78	57
		Total	164

The grade point average (GPA) was computed by using A = 4, B = 3, C = 2, D = 1, and F = 0. All six school subjects taken by students were used in computing the GPA.

Fourteen ninth-grade boys were removed from the original subject pool because no data were available on their first semester grades, in most cases due to the fact that they had transferred to Andrew Hill High School during the current school year and transcripts from the previous school had not been received.

Nine eleventh-grade boys were removed from the original subject pool because no data were available on their first semester grades.

One hundred forty-four subjects at each of the two grade levels were needed to fill all cells (see Table 9). There were 175 ninth-grade boys and 164 eleventh-grade boys available. Those above the 144 needed were held in reserve to use in case of absences during the administration of the treatments or the collection of criterion measures.

The Holland Vocational Preference Inventory (VPI) Sixth Revision was used to assess the initial vocational interests of subjects in this experiment. The VPI was administered to all subjects four weeks prior to the treatment sessions. The VPI presents 160 job titles to which subjects respond "yes" or "no" to indicate whether or not the occupation appeals to them. The item is left blank to indicate indecision about the job's appeal. Factor analytic studies have shown that preference for occupations can be grouped into six categories: realistic, intellectual, social, conventional, enterprising, and artistic (Manual Vocational Preference Inventory, 1965). Norms on subjects comparable to those in this experiment were not available so the raw scores on the six scales were converted to percentile scores in order that scores on the six scales could be compared. Table 3 presents the percentile equivalents for each raw score on each of the six scales based on the ninth- and eleventh-grade subject pool in this experiment. While the percentiles were computed on the 314 boys to whom the inventory was administered, only 193 could be used in the research design (see Table 8). Seventy-one of the subjects were in the control group which was not used in this analysis. Fifty subjects were not used because they were absent on the day the treatments were administered, had other data missing, or were part of the unused reserve pool.

TABLE 3

PERCENTILE EQUIVALENTS FOR SIX SCALES OF THE HOLLAND VOCATIONAL PREFERENCE INVENTORY

N = 314 9th and 11th Grade Boys

Raw Scores	Percentile Equivalents for Six Scales Realistic	Intellectual	Social	Conventional	Enterprising	Artistic
14	99	99	99	99	99	99
13	99	98	99	99	99	99
12	98	97	99	99	99	99
11	97	95	99	99	98	98
10	96	92	97	99	98	98
9	93	90	96	99	97	96
8	88	86	95	98	95	95
7	84	84	94	97	93	92
6	78	80	92	94	89	89
5	72	76	88	91	84	84
4	62	70	84	89	79	79
3	53	63	80	84	73	72
2	41	56	70	78	61	65
1	28	46	54	69	49	48

A comparison of the percentile equivalents obtained in this study with the published norms (see Table 4) based on college freshmen reveal that the ninth- and eleventh-grade sample made lower raw scores on all scales than did the college freshman sample. The raw scores on the six scales are obtained by counting the number of occupations in each of six categories for which the subject indicates a preference. The lower raw scores made by the high school sample indicate fewer preferences. The high school and college samples are most nearly alike on the realistic scale which includes the following occupations: agricultural science, architecture, engineering, farming, forestry, geography, and industrial art education.

The college freshman group represent a sample which is older, more select academically, and probably more favored economically than the high school group. These differences in the two groups may account for the differences between the two sets of norms.

The low raw scores for the high school group indicate a relatively limited range of occupational interests among these students.

TABLE 4

NATIONAL NORMS FOR COLLEGE FRESHMEN MEN (N 6290) ON SIX SCALES OF THE HOLLAND VOCATIONAL PREFERENCE INVENTORY*

			VPI Scales			
Raw Scores	Realistic	Intellectual	Social	Conventional	Enterprising	Artistic
14	99	98	99	99	99	99
13	98	94	98	99	99	98
12	96	90	96	97	97	96
11	94	85	94	95	94	94
10	91	81	90	93	91	92
9	87	76	86	90	86	89
8	82	70	81	87	81	85
7	77	65	75	84	75	81
6	70	59	69	80	67	76
5	63	52	61	75	59	70
4	55	45	53	69	50	63
3	45	38	43	61	40	55
2	33	29	32	51	30	45
1	20	20	20	35	18	32

*Manual Vocational Preference Inventory, 1965, p.32.

Experimental Treatments

The simulated vocational problems in sales, medical laboratory technology, and x-ray technology were presented in booklet form (Krumboltz and Baker, 1966; Krumboltz and Johnson, 1966a, 1966b). These booklets were used in previous research and are described in the report of these studies (Krumboltz, 1967). A problem-solving booklet in accounting is reproduced in the study by Sheppard (1967).

In selecting the occupations to be included the following criteria were used:

1. The occupations, although open to either men or women, should be definitely suited for men.
2. The occupations should be ones for which some training or preparation is required; but that preparation, at least on an entry level, should be less than a four-year baccalaureate degree.
3. The occupations should not be "glamour" jobs to which some students already aspire on the basis of superficial information.
4. The occupations must be in some social demand according to the best estimates available to the U.S. Department of Labor, and the demand should clearly be present in the local area where the studies are being conducted.
5. The occupations should require no rare or unusual skill for successful performance.
6. Each occupation should be related to other occupations of greater or lesser levels of skill.

Occupations in sales, medical laboratory technology, and x-ray technology were thought to meet the above criteria (Krumboltz, 1967).

Description of Treatment Materials

A. Problem-Solving Booklets

1. The problem-solving booklet in sales contains the following:
    a. introductory statements regarding the role of the salesman as a representative of a business or company and as an aide to the buyer;
    b. a script relating a fictional sales setting;
    c. instructional material that draws from the fictional sales setting key points in making a sales presentation;

d. problem-solving materials that allow the students to improve the sales presentation in the fictional scene according to the instructional material.

2. The problem-solving booklet in laboratory technology contains:

a. introductory statements concerning the value of the occupation and its importance to the doctor and patient;

b. a description of a medical case to illustrate the laboratory technologist's role;

c. a description of blood cells and an explanation of the purposes and techniques in making a differential white cell count;

d. pictures of blood cells to provide the student an opportunity to practice identifying the different white cells;

e. six photomicrographs of a blood sample from a patient suspected of having appendicitis. These are for use by the student in making the differential white cell count which is the major problem presented in this booklet;

f. answers to allow the student to correct and evaluate his performance.

3. The problem-solving booklet on X-ray technology contains 25 pages and a packet of nine 8½ x 11 X-ray films. The contents include:

a. introductory statements regarding the role of the X-ray technician and his importance to the doctor and patient;

b. a description of a medical case to acquaint the student with the technician's job and the steps required in the processing of high quality X-ray films;

c. ten problems regarding the X-ray films. The problems are ones encountered daily by X-ray technicians and deal with clerical accuracy in handling X-ray records, knowledge of the X-ray process, and ability to identify flaws in finished films and to determine their probable causes;

d. answers to the problems which allow the student to correct and evaluate his performance.

The following modifications were made in the booklets for use in this investigation.

1. The sales booklet was shortened by removal of one problem section in order to insure completion of the problems by students in the allowed time period. Experience with this booklet had revealed that slower readers found it difficult to finish.
2. Some hints which assisted students with the solution to problems in the medical laboratory technologist and X-ray technician booklets were removed in order to spread the range of scores obtained on these booklets.

B. Method of Manipulating Difficulty Level

Answer forms accompanied each booklet. These forms allow space for answers to problems presented in the booklets to be written. Space is also provided for the student to indicate correct answers and to total correct responses upon completion of the booklet. The answer form also helps the student to evaluate his score by giving a criterion score which indicates successful completion of the booklet.

Criterion scores for success were established at three different difficulty levels for each occupation to provide levels of success which were easy, moderately difficult, and difficult to achieve. These levels were established in a pilot study using 351 tenth-grade students from Andrew Hill High School. The pilot study was conducted during the semester prior to the actual experiment.

The criterion scores for each level of difficulty in achieving success were defined as follows:

1. Easy, a score obtained or exceeded by 90 per cent of the tenth-grade subjects.

2. Moderately difficult, a score obtained or exceeded by 50 per cent of the tenth-grade students.

3. Difficult, a score obtained or exceeded by only 10 per cent of the tenth-grade students.

TABLE 5

CRITERION SCORES FOR SUCCESS AT THREE LEVELS OF DIFFICULTY BASED ON TENTH-GRADE STUDENT SCORES

Occupation	Total Score Possible	Criterion Scores for Success Easy	Moderate	Difficult	Number of Students Used in Establishing Criteria
Sales	43	20	33	40	121
Medical Lab. Technician	31	25	28	31	111
X-Ray Technician	15	9	13	15	119
				Total	351

For each occupation three different sets of answer forms, one set for each difficulty level, were printed. The criterion score corresponding to the level of difficulty was printed on the answer form along with the information that it was a very good score and that the student had been successful if he achieved or surpassed the criterion score. Sample answer forms appear in Appendix A. The problem-solving occupational booklets and answer forms were prepared to be completed by students within a 50-minute school period. Previous work with these materials including the pilot study for this experiment found 50 minutes to be an adequate time period except for the sales booklet which was shortened for this experiment.

c. Control Treatment Booklet

The booklet, Career Kit (Krumboltz and Sheppard, 1965), which was produced as a control treatment for Sheppard's study (1967) was used with the control group in this experiment.

The booklet contains general vocational planning information and suggestions stressing the importance of planning and some of the factors to be considered.

An answer form accompanied the control booklet and called for the subject to indicate his abilities and interests. Neither the control booklet nor the answer form called for the solution of problems. The answer form was used in order to make the control treatment as similar as possible to the experimental treatment in all respects other than problem-solving. The answer form for the control treatment is displayed in Appendix B.

The three occupational problem-solving booklets and the control booklet were all similar in outward appearance.

Criterion Measures

The purpose of the study was to find ways of encouraging students to explore vocational opportunities and to deliberate about the meaning of these opportunities for their own vocational choice. Consequently, changes in vocational interests, attempts to take advantage of increased occupational knowledge were considered as evidence. The following criterion instruments were used:

1. Responses on a vocational interest inventory.

An interest inventory was constructed listing 10 specific occupations including the three occupations of special concern in this study and a general occupational information category. For each of the ten specific occupational categories and the one general category, subjects indicated their interest in learning more on a five-point scale. This form is displayed in Appendix C. This measure was taken one week following the administration of the treatments.

Responses to the sales, medical laboratory technologist, X-ray technician and general occupational information categories were recorded and analyzed.

2. Amount of Information-Seeking

Students were presented with a number of standard opportunities to seek further vocational information during the weeks immediately following the experimental treatment. The following opportunities were presented to each student in the experiment.

a. An opportunity to mail a post card requesting occupational information requiring the subject merely to check occupations of interest, affix his own name and address and mail.

At the end of the 50-minute treatment period, each subject was given a post card addressed to the Stanford University School of Education on which the subject could by checking the appropriate box or boxes request information on sales, medical laboratory technology, x-ray technology, or general career information. A sample card is illustrated in Appendix D.

The cards on which students had filled in their names and addresses were recorded as they were received in the mail of the School of Education. The number of cards mailed during the week following the treatment and received at Stanford was used as one criterion measure of information-seeking.

b. an opportunity to sign up for a special vocational counseling interview.

Also at the end of the 50-minute treatment period, each subject was given a Request to See Counselor Form. This form (Appendix E) is similar to the one in standard use in the high school. Normal procedure in the school for a student to request a counseling interview is to obtain a form available at a special table in the school library, fill out the form and deposit the form in a box for his counselor on the same table in the library.

The request form used in the experiment had the word SPECIAL at the heading and was printed on white paper instead of pink which is used by the school so that the forms could be readily identified. A special box was placed along side the counselors' boxes in the library. The box was labeled "Special Request to See Counselor."

The forms were collected from the special box each day. The counselors in the school were alerted to be on the lookout for any of the special forms which might be turned in to them.

The number of Special Request to See Counselor Forms submitted by students was used as one criterion measure of information-seeking.

c. An opportunity to ask questions about occupations of interest.

During the last five minutes of the treatment period, all subjects were requested to look at the back of their answer forms. On the back of the form, students were given the opportunity to write questions about occupations or career planning which would be answered by a vocational counselor from Stanford University the following week. Appendix F displays the form used to collect this data. The number of subjects to ask one or more questions was used as a criterion measure of information seeking.

d. An opportunity to sign up to work on other similar occupational booklets.

During the last five minutes of the treatment period, all subjects were given an opportunity to sign up to work on another similar occupational booklet if they wished. The form used to collect this data is shown in Appendix F. The number of subjects requesting additional booklets was used as a criterion measure of information-seeking.

e. An opportunity to use career materials available in the school library.

For a week following the administration of the booklets, a special exhibit of library materials on specific occupational information, general vocational fields, vocational training opportunities, and career planning was prominently displayed in the library. A sign indicated to students that the materials displayed were not currently available but that they would be available in about one week for those who signed requests for them now. Each item displayed was numbered, and forms on which students could request the items by number were available at the display. A box to receive the forms once students had filled them out was also available at the display. The number of forms requesting library materials on occupations was used as a measure of information-seeking. (See Appendix G)

The post card and counselor request form were carried out of the treatment session by students along with a page titled MORE ABOUT OCCUPATIONS (Appendix H) which announced the display in the library, described the process for requesting a counselor interview, and suggested that additional occupational information could be obtained by mailing the post cards, visiting the library, and signing up to see a counselor.

3. Scores on an information test constructed to assess knowledge of facts relating to the occupation studied.

An occupational fact sheet presenting information taken largely from The Occupational Outlook Handbook (1966) was prepared on each of the three occupations of concern (Appendix I). The fact sheets were stapled together in random order, and six days following the treatment procedures the fact sheets were distributed, each subject receiving fact sheets on all three occupations.

The day following the distribution of the fact sheets, a 25-question multiple choice test (Appendix J) covering the occupational information on the fact sheet corresponding to the treatment booklet used by each subject was administered. Each experimental subject was tested on information in the fact sheet corresponding to the occupation he had been exposed to in the problem-solving booklet. Control subjects were randomly assigned information tests on one of the three occupations.

Standard scores from these tests were used as criterion measures, the assumption being that the more highly motivated students would read the fact sheets more carefully and would retain more information than those less motivated.

Experimental Procedures

A. Experimental Schedule

The various phases of the experiment were completed during 1967 as follows:

1. The week of January 9 - January 13: Pilot study with tenth-graders to establish success criteria for the three occupational booklets.
2. The week of February 27 - March 3: Compilation of list of subjects and computation of grade point averages.

3. The week of March 6 - March 10: Administration of the Holland VPI to all subjects.

4. April 4: Administration of treatments to eleventh-graders.

5. April 6: Administration of treatments to ninth-graders.

6. April 10: Distribution of Occupational Fact Sheets to eleventh-graders.

7. April 12: Distribution of Occupational Fact Sheets to ninth-graders.

8. April 11: Administration of information tests and interest inventories to eleventh-graders.

9. April 13: Administration of information tests and interest inventories to ninth-graders.

10. The period April 3 - April 13: Collection of data on requests to see counselor, requests for library materials, and receipt of post cards.

B. Testing Procedures

The *Vocational Preference Inventory* (VPI) was administered by ninth- and eleventh-grade social studies teachers during the last 20 minutes of the regular social studies period. The inventory is not timed and requires no special skill or training to administer. Each teacher was contacted individually by the experimenter prior to the administration of the inventory. Each was shown the inventory and answer sheet and given directions for administration.

For ease of administration the inventory was administered to both boys and girls in the classes involved although only the data collected on boys was of concern in this study.

The inventories were scored by clerical help and percentile scores were computed by the investigator. For each subject the scale receiving the highest percentile score was identified as his initial vocational interest. The division of subjects by initial interest, ability, and occupational booklet is presented in Table 8.

The following is a sample of some of the occupations included in each of the six scales (Holland, 1964):

1. Realistic

   Airplane Mechanic
   Filling Station Attendant
   Master Plumber
   Radio Operator
   Surveyors
   Tool Designer

2. Intellectual

   Astronomer
   Biologist
   Chemist
   Physicist
   Geologist

3. Social

   Clinical Psychologist
   High School Teacher
   Marriage Counselor
   Playground Director
   Speech Therapist

4. Conventional

   Bank Teller
   Bookkeeper
   IBM Equipment Operator
   Payroll Clerk
   Statistician
   Tax Expert

5. Enterprising

   Business Executive
   Buyer
   Hotel Manager
   Salesman
   Restaurant worker

6. Artistic

   Author
   Cartoonist
   Commercial Artist
   Musician
   Stage Director

The information tests on each of the three occupations dealt with in this study consisted of 25 four-choice multiple choice questions. The tests were administered by a group of research assistants from Stanford University.

The tests were administered in regular social studies classes one week following the administration of the treatment conditions and one day following the distribution of the fact sheets to all subjects.

For ease of administration, the fact sheets and the subsequent test were given to both boys and girls although only the data from the boys was used in this investigation.

Treatment Administration Procedures

Arrangements were made to administer the experimental and control treatments during the regular social studies class periods. The project was explained in detail by the investigator in individual conferences with the deputy superintendent of the East Side Union High School District, the principal of Andrew Hill High Schol, the chairman of the high school's social studies department, the social studies teachers involved, the school's counseling staff, and school librarian. The school personnel were most cooperative.

So as to upset the school's routine as little as possible, the VPI, the treatment procedures, and all criterion measures were administered to both boys and girls in all classes involved. Data on the girls has been collected for future analysis but was not part of this investigation.

The school's teaching staff had no responsibilities in the administration of treatments or the collection of criterion data. A team of four Stanford University research assistants working with the investigator administered the treatments and collected all data. The team of research assistants had been working on simulation materials for a related project and were familiar with the treatments being administered.

One day prior to the administration of booklets, a meeting was held for a final briefing on procedures.

The booklets require no oral instructions. In each class the treatment administrators introduced themselves as being from Stanford University. Students were told that some vocational materials had been produced and were being tried out in a number of high schools. The problem-solving booklets, control booklets and answer sheets were distributed, and the subjects were asked to read and follow the directions in the booklet. Students' questions were answered, but subjects were encouraged to read the booklet directions carefully.

Assignment of subjects to the control booklets and to the occupational problem-solving booklets of various levels of difficulty was done randomly from an alphabetical listing of the subject pool in a manner which assured equal cell frequencies (Tables 1 and 2).

Subjects absent on the day the booklets were administered were dropped from the experiment with the exception of six eleventh-grade subjects who were needed to fill cells which could not be equalized from those present the day the treatment was administered. Six eleventh-grade subjects who were absent on the day of the treatment but present the following day were given the treatment materials by the investigator in the school library during their regular social studies period on the day of their return to school.

The school period was 55 minutes in length, and 50 minutes was allowed for distribution and completion of the problem-solving booklets. Five minutes before the end of the period the treatment administrator stopped the subjects, had them total their scores if this had not already been done, and asked them to turn over the answer sheet and read the information presented. Treatment administrators were told to make sure that each student had this part of the answer form called to his attention but to do nothing which might influence his response or his inclination to respond to the items which were used as criterion measures.

The booklets were collected and the paper titled MORE ABOUT OCCUPATIONS with the post card and counselor request form stapled to it was distributed to all subjects before they left the room.

This procedures was followed in each social studies class involved. Five members of the research team were able to administer the treatments to all eleventh-graders on one day and to all ninth-graders on another day.

Follow-Up Procedures

When the experiment was over and all criterion data collected, the displayed occupational materials and samples of the occupational booklets were placed in the school library for student use. All students mailing the post card requesting occupational information were sent the booklet Career Opportunities. One week following the treatment and after all data had been collected, the experimenter and four research assistants from Stanford University, all of whom were in a doctoral program in guidance, visited the same social studies classes to answer questions the students had about the problem-solving materials and about vocational and educational planning.

Following the completion of all the treatments, the answer forms were inspected. A tally was made of subjects in each group who indicated on their answer forms that they had successfully achieved the criterion score. The percentages achieving success by occupation of booklet used, difficulty level, and ability of subject are presented in Table 6.

TABLE 6

PERCENTAGE OF SUBJECTS REPORTING ACHIEVEMENT OF CRITERION SCORE FOR SUCCESSFUL COMPLETION OF TASK

Occupation	Difficulty Level Easy	Moderate	Difficult	Ability Level Low	Middle	High	Total
Med. Lab	79.2	79.2	12.5	45.8	52.2	70.8	55.7
X-Ray	83.3	37.3	0.1	37.5	33.3	54.2	41.7
Sales	70.8	41.7	29.2	41.7	37.5	62.5	47.2
Total	77.8	52.8	15.3	41.7	41.7	62.5	48.6

The inability of criterion scores established in the pilot study to define difficulty levels which were equal across occupations in this research is a function of the reliability of the scores on each of the booklets used as well as the differences between the pilot study group and the subjects in this study.

The number of items scored in each booklet ranged from 43 items in the sales booklet to 15 items in the X-ray booklet. These differences in number of items on each of the three occupational booklets contribute to the differences in reliability of the scores.

While the high ability group outperformed the other two groups on the occupational problems, there was no apparent difference in performance between the lower and middle groups.

Experimental Design

The subject pool was divided into three ability levels on the basis of first semester grades. Simulated problems of three levels of difficulty for each occupation were assigned at random to subjects from each of the ability levels as illustrated in Table 7.

TABLE 7

NUMBER OF SUBJECTS PER CELL IN EXPERIMENT TO TEST OPTIMAL DIFFICULTY LEVEL FOR STUDENTS OF DIFFERING ABILITY LEVELS OF EACH OF TWO GRADE LEVELS

Grade 9

Problem-Solving Kit	Difficulty Level	Student Ability Level High	Middle	Low	Total
Sales Work	Difficult	4	4	4	12
	Modl Diff.	4	4	4	12
	Easy	4	4	4	12
X-Ray Technician	Difficult	4	4	4	12
	Mod. Diff.	4	4	4	12
	Easy	4	4	4	12
Medical Technologist	Difficult	4	4	4	12
	Mod. Diff.	4	4	4	12
	Easy	4	4	4	12
Total		36	36	36	108

Grade 11

Problem-Solving Kit	Difficulty Level	Student Ability Level High	Middle	Low	Total
Sales Work	Difficult	4	4	4	12
	Mod. Diff.	4	4	4	12
	Easy	4	4	4	12
X-Ray Technician	Difficult	4	4	4	12
	Mod. Diff.	4	4	4	12
	Easy	4	4	4	12
Medical Technologist	Difficult	4	4	4	12
	Mod. Diff.	4	4	4	12
	Easy	4	4	4	12
Total		36	36	36	108
				Grand Total	216

A 2x3x3x3 factorial design resulted, and analysis of variance was used to test for the effects of grade level, different difficulty levels, ability levels, the three occupations, and all interactions using each of the criterion measures. The total N in this analysis was 216.

In a second analysis subjects were organized on the basis of their highest initial interest on the Holland Vocational Preferences Inventory. Subjects within each preference group had difficulty level booklets assigned at random since these were the identical subjects from the prior analysis except that 35 subjects had to be dropped from this analysis because VPI data were unavailable.

A 3x3x6 factorial design with unequal cell frequencies resulted as illustrated in Table 8.

TABLE 8

NUMBER OF SUBJECTS PER CELL IN EXPERIMENT TO TEST OPTIMAL DIFFICULTY LEVEL FOR SUBJECTS WITH DIFFERING INITIAL OCCUPATIONAL INTERESTS

Grades 9 and 11

Problem-Solving Kit	Difficulty Level	Initial High Interest						
		Realistic	Intellectual	Social	Conventional	Enterprising	Artistic	Total
Sales Work	Diff.	5	8	0	1	5	3	22
	Mod.Diff.	9	3	4	3	1	2	22
	Easy	5	3	3	4	3	3	21
X-Ray Technician	Diff.	6	2	3	3	4	2	20
	Mod. Diff.	2	5	5	4	3	1	20
	Easy	3	6	2	3	6	2	22
Medical Technologist	Diff.	4	4	6	3	2	4	23
	Mod. Diff.	1	4	4	4	2	6	21
	Easy	2	5	6	2	3	4	22
Total		37	40	33	27	29	27	193

Analysis of variance with adjustments for unequal cell frequencies was used to test for the effects of different difficulty levels, initial interests, the three occupations, and all interactions. The total N for this analysis was 193.

In a third analysis, problem-solving booklets at three difficulty levels and a control booklet were compared. From the same subject pool as subjects used in the above analyses, thirty-six subjects at each of the two grade levels and grouped by ability were randomly chosen to receive control booklets. The control booklets contained general vocational planning information not involving problem-solving. The 2x3x4 factorial design which resulted was tested using analysis of variance with receipt of post card requests for information as the criterion measure. The total N for this third analysis was 288 (see Table 9).

TABLE 9

NUMBER OF SUBJECTS PER CELL IN EXPERIMENT TO COMPARE PROBLEM-SOLVING AND CONTROL TREATMENTS

Grade 9

Treatment	Student Ability Level High	Medium	Low	Total
Difficult Problem-Solving	12	12	12	36
Moderately Difficult Problem-Solving	12	12	12	36
Easy Problem-Solving	12	12	12	36
Control (No problem-solving)	12	12	12	36
Total	48	48	48	144

Grade 11

Treatment	Student Ability Level High	Medium	Low	Total
Difficult Problem-Solving	12	12	12	36
Moderately Difficult Problem-Solving	12	12	12	36
Easy Problem-Solving	12	12	12	36
Control (No problem-solving)	12	12	12	36
Total	48	48	48	144
			Grand total	288

Statistical Procedures

The information tests constructed in each of the three occupational fields: sales, medical laboratory technology, and X-ray technology were administered as a criterion measure one week following the treatment procedures. Table 10 presents the means and standard deviations obtained from the administration of these tests.

TABLE 10

OCCUPATIONAL INFORMATION TESTS

MEANS AND STANDARD DEVIATIONS

Test	Mean	Standard Deviation	N
Medical Lab. Technician	12.47	4.05	106
X-Ray Technician	12.75	4.31	105
Sales	13.18	4.07	108

For each of the three tests, the raw scores were converted to standard T scores, with means equal to 50, and standard deviations equal to 10. The standard scores were used in the statistical analysis of this criterion measure.

A 2x3x3x3 factorial analysis of variance design was used to test the first four research hypotheses. The effects of grade level, ability level, occupation, and level of difficulty as well as all first and higher order interactions were tested.

Data were keypunched on IBM cards and verified at the Stanford University Computation Center. The analyses were computed on the IBM 7090 computer using program BMDO2V from the *Biomedical Computer Programs* (Dixon, 1965).

A 3x3x6 factorial analysis of variance design was used to test Hypothesis V which dealt with the effects of initial interest, difficulty level, occupation and all first and higher order interactions. The *Biomedical Computer Programs* program BMDO5V which allows for unequal cell frequencies was used in these analyses. This program also permits the introduction of covariates. In using information test scores as a dependent variable, grade point average was used as a covariate to make the analysis more sensitive to existing differences.

In testing Hypothesis VI a control group was compared with problem solving treatments at each of the three levels of difficulty. A 2x3x4 factorial analysis of variance design resulted. Grade, ability, and treatments -- Easy Problem-Solving, Moderately Difficult Problem-Solving, Difficult Problem-Solving and Control -- were tested for main effects and all interactions using the BMDO2V computer program. For this analysis the mean number of post cards mailed per cell was used as the dependent variable.

CHAPTER III

RESULTS AND DISCUSSION

The plan for testing the three directional hypotheses which predicted that subjects working on moderately difficult simulated problems would obtain higher scores on all criterion measures called for testing null hypotheses.

Only if the null hypotheses were rejected would an incidental comparison as described in Hayes (1965, pp. 483-489) be used to test for a difference between the moderately difficult treatment and the combination of the other two treatments, easy and difficult.

I. Results of Tests of Hypothesis I

The test was made of the null hypothesis that there were no effects due to the difficulty of achieving success on simulated problems when expressed interest in learning more about occupations was used as a dependent variable.

Interest in learning more about occupations was measured on a scale of 1 to 5 (low to high) for ten specific occupations and one general occupational information category (Appendix C). Scores for each subject were recorded for scales indicating an interest in learning more about medical laboratory technology, sales, X-ray technology and general occupational information. A separate analysis was made of subject responses to each of these four scales. The specific occupational scale corresponding to the occupation encountered by the subject in the problem booklet will be referred to as the "own scale." An additional analysis was made using subject responses on the "own scale."

The results of the analyses using these five scales are presented in the tables which follow.

Criterion Measure: Interest in Learning More About Medical Laboratory Technology

Using self-reported interest in learning more about medical laboratory technology as a measure, the only significant effect ($p<.05$) was due to the occupation of the problem-solving booklets used in the experiment. The results of analysis of variance using interest in medical technology as a criterion measure is shown in Table 11.

The effect of difficulty while in the predicted direction was not statistically significant. The means for each level of difficulty are shown in Table 12.

There was a significant effect due to the occupation of the booklet used. As might be expected, subjects who had worked on the Medical Laboratory Technologist booklet expressed more interest in learning more about this occupation than did subjects who had worked on other booklets. Table 13 presents the means for these occupational groups.

TABLE 11

ANALYSIS OF VARIANCE OF SELF-RATINGS OF INTEREST IN LEARNING MORE ABOUT MEDICAL LABORATORY TECHNOLOGY

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	F
1. Grade	1	.00	.00	.00
2. Ability level	2	7.86	3.93	2.34
3. Occupation	2	30.19	15.10	8.99**
4. Difficulty	2	.25	.12	.07
1 x 2	2	1.08	.54	.32
1 x 3	2	7.86	3.93	2.34
1 x 4	2	1.19	.59	.35
2 x 3	4	2.03	.51	.30
2 x 4	4	1.97	.49	.29
3 x 4	4	4.47	1.12	.67
1 x 2 x 3	4	13.97	3.49	2.08
1 x 2 x 4	4	.80	.20	.12
1 x 3 x 4	4	2.03	.51	.30
2 x 3 x 4	8	14.47	1.81	1.08
1 x 2 x 3 x 4	8	16.80	2.10	1.25
Within Replicates	162	271.50	1.68	
Total	215	376.50		

**$p < .001$

TABLE 12

MEAN SELF-RATINGS OF INTEREST IN MEDICAL LABORATORY TECHNOLOGY BY DIFFICULTY LEVEL

Difficulty Level	N	Mean*
Easy	72	2.42
Moderately Difficult	72	2.46
Difficult	72	2.38

*Differences between means not sifnigicant, $p > .10$

TABLE 13

MEAN SELF-RATINGS OF INTEREST IN MEDICAL LABORATORY TECHNOLOGY BY OCCUPATION

Occupation	N	Mean*
Medical Lab Tech.	72	2.94
X-Ray Technology	72	2.12
Sales	72	2.18

*Differences between means significant, $p < .001$.

Criterion Measure: Interest in Learning More About Sales

A significant main effect due to occupation was found using interest in learning more about sales as a measure, but this effect was complicated by significant third- and fourth-order interactions. The results of the analysis of variance using interest in sales as a measure are shown in Table 14.

When interest in learning more about sales as an occupation was used as the dependent variable, the effect of difficulty was in the predicted direction although the differences were extremely small and not statistically significant. These means are shown in Table 15.

The effect of occupation was significant at the .001 level, and the mean self-rated interest in sales is presented in Table 16 for each group according to the occupational booklet used.

The effects of occupation are complicated by a significant interaction between difficulty level, occupation, and ability. The means for this interaction are given in Table 17.

TABLE 14

ANALYSIS OF VARIANCE OF SELF-RATINGS OF INTEREST IN LEARNING MORE ABOUT SALES

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	F
1. Grade	1	.07	.07	.08
2. Ability Level	2	4.75	2.38	2.49
3. Occupation	2	18.25	9.12	9.91**
4. Difficulty	2	.19	.10	.11
1 x 2	2	1.40	.70	.76
1 x 3	2	.40	.20	.22
1 x 4	2	4.45	2.23	2.42
2 x 3	4	5.67	1.42	1.54
2 x 4	4	7.05	1.76	1.91
3 x 4	4	7.22	1.80	1.96
1 x 2 x 3	4	2.80	.70	.76
1 x 2 x 4	4	3.91	.98	1.06
1 x 3 x 4	4	1.24	.31	.34
2 x 3 x 4	8	16.61	2.08	2.26*
1 x 2 x 3 x 4	8	18.98	2.37	2.58*
Within Replicates	162	149.50	.92	
Total	215	242.50		

*$p \leq .05$

**$p \leq .001$

TABLE 15

MEAN SELF-RATINGS OF INTEREST IN SALES BY DIFFICULTY LEVEL

Difficulty Level	N	Mean*
Easy	72	1.76
Moderately Difficult	72	1.78
Difficult	72	1.71

*Differences between means not significant, $p > .10$

TABLE 13

MEAN SELF-RATINGS OF INTEREST IN MEDICAL LABORATORY TECHNOLOGY BY OCCUPATION

Occupation	N	Mean*
Medical Lab Tech.	72	2.94
X-Ray Technology	72	2.12
Sales	72	2.18

*Differences between means significant, $p < .001$.

Criterion Measure: Interest in Learning More About Sales

A significant main effect due to occupation was found using interest in learning more about sales as a measure, but this effect was complicated by significant third- and fourth-order interactions. The results of the analysis of variance using interest in sales as a measure are shown in Table 14.

When interest in learning more about sales as an occupation was used as the dependent variable, the effect of difficulty was in the predicted direction although the differences were extremely small and not statistically significant. These means are shown in Table 15.

The effect of occupation was significant at the .001 level, and the mean self-rated interest in sales is presented in Table 16 for each group according to the occupational booklet used.

The effects of occupation are complicated by a significant interaction between difficulty level, occupation, and ability. The means for this interaction are given in Table 17.

TABLE 14

ANALYSIS OF VARIANCE OF SELF-RATINGS OF INTEREST IN LEARNING MORE ABOUT SALES

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	F
1. Grade	1	.07	.07	.08
2. Ability Level	2	4.75	2.38	2.49
3. Occupation	2	18.25	9.12	9.91**
4. Difficulty	2	.19	.10	.11
1 x 2	2	1.40	.70	.76
1 x 3	2	.40	.20	.22
1 x 4	2	4.45	2.23	2.42
2 x 3	4	5.67	1.42	1.54
2 x 4	4	7.05	1.76	1.91
3 x 4	4	7.22	1.80	1.96
1 x 2 x 3	4	2.80	.70	.76
1 x 2 x 4	4	3.91	.98	1.06
1 x 3 x 4	4	1.24	.31	.34
2 x 3 x 4	8	16.61	2.08	2.26*
1 x 2 x 3 x 4	8	18.98	2.37	2.58*
Within Replicates	162	149.50	.92	
Total	215	242.50		

$^{*}p \leq .05$

$^{**}p \leq .001$

TABLE 15

MEAN SELF-RATINGS OF INTEREST IN SALES BY DIFFICULTY LEVEL

Difficulty Level	N	Mean*
Easy	72	1.76
Moderately Difficult	72	1.78
Difficult	72	1.71

*Differences between means not significant, $p > .10$

TABLE 16

MEAN SELF-RATINGS OF INTEREST IN SALES BY OCCUPATION

Occupation	N	Mean*
Medical Lab Tech	72	1.79
X-Ray Technology	72	1.37
Sales	72	2.08

*Differences between means significant, $p < .001$.

TABLE 17

MEAN SELF-RATINGS OF INTEREST IN SALES BY OCCUPATION, DIFFICULTY LEVEL, AND ABILITY*

Occupation	Difficulty Level	Ability Level			Difficulty Total	Occupation Total
		Low	Middle	High		
Med Lab Tech	Easy	1.87	1.87	1.37	1.70	
	Mod. Diff.	1.50	1.75	1.75	1.67	1.79
	Difficult	2.37	2.12	1.50	2.00	
X-Ray Tech	Easy	1.00	1.25	1.37	1.21	
	Mod. Diff.	1.87	1.37	1.50	1.58	1.37
	Difficult	1.37	1.37	1.11	1.50	
Sales	Easy	2.75	2.87	1.50	2.37	
	Mod. Diff.	3.12	1.25	1.87	2.08	2.08
	Difficult	1.75	1.37	2.25	1.79	
		1.96	1.67	1.62	1.75	1.75

*Interaction significant, $p < .05$.

For the low and middle ability subjects who worked on the sales problem booklet, more sales interest was generated by the easy or moderate difficulty levels, while for the high ability groupthe difficult treatment produced more interest. For low and middle ability subjects who worked on the Medical Laboratory Technologist booklet more sales interest occurred with the difficult treatments. For the subjects who worked on the X-Ray Technician booklets, the most interest in sales was generally found with the moderately difficult treatment. In only one of the nine groups was the mean for the easy treatment higher than both of the other two difficulty levels.

Table 18 presents all cell means so that the significant four-way interaction, grade level x ability level x occupation x difficulty level, may be examined.

For those ninth-grade students who worked with sales problem materials, the easy and moderate difficulty levels produced more sales interest for low and middle ability groups while the difficult kit produced more interest for the high ability group. This part of the interaction is what one might well predict. However, for eleventh-grade subjects who worked with the sales problem materials, the means favored the easy or moderate treatment over the difficult one for all ability groups.

Of the 18 sets of means grouped by occupation, ability level and grade level, four means favor the easy treatment, eight the moderate treatment, three the difficult treatment, and three indicated no direction. All three means favoring the difficult treatment occur at the ninth-grade level, and three of the four means favoring the easy treatment occur at the eleventh-grade level.

TABLE 18

MEAN SELF-RATINGS OF INTEREST IN SALES BY GRADE, OCCUPATION, DIFFICULTY LEVEL, AND ABILITY LEVEL*

Grade	Occupation	Difficulty Level	Ability Level			Difficulty Total	Occupation Total
			Low	Middle	High		
9	Med Lab	Easy	2.00	1.00	1.00	1.33	1.75
		Mod. Diff.	1.50	1.50	2.25	1.75	
		Difficult	2.00	3.00	1.50	2.17	
			1.83	1.83	1.58		
9	X-Ray	Easy	1.00	1.25	1.25	1.17	1.42
		Mod. Diff.	2.50	1.50	1.00	1.67	
		Difficult	1.75	1.00	1.50	1.42	
			1.75	1.25	1.25		
9	Sales	Easy	2.75	3.00	1.00	2.25	2.14
		Mod. Diff.	3.50	1.50	1.50	2.17	
		Difficult	1.75	1.25	3.00	2.00	
			2.67	1.92	1.83		
			2.08	1.67	1.55	1.77	
11	Med Lab	Easy	1.75	2.75	1.75	2.08	1.83
		Mod. Diff.	1.50	2.00	1.25	1.58	
		Difficult	2.75	1.25	1.50	1.83	
			2.00	2.00	1.50		
11	X-Ray	Easy	1.00	1.25	1.50	1.25	1.33
		Mod. Diff.	1.25	1.25	2.00	1.50	
		Difficult	1.00	1.25	1.50	1.25	
			1.08	1.25	1.67		
11	Sales	Easy	2.75	2.75	2.00	2.50	2.03
		Mod. Diff.	2.75	1.00	2.25	2.00	
		Difficult	1.75	1.50	1.50	1.58	
			2.42	1.75	1.92		
			1.83	1.67	1.69	1.73	

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*Interactions significant, $p < .05$.

Criterion Measure: Interest in Learning More About X-Ray Technology

Using interest in X-Ray Technology as a criterion measure, none of the main effects or interactions reached statistical significance. Table 19 shows the results of the analysis of variance using this measure.

The small, nonsignificant differences among means for different difficulty levels were in the direction opposite to that hypothesized. Table 20 presents these means.

There was a trend in the means to favor the easy treatment for low ability subjects and the difficult treatment for high ability subjects, but this interaction did not reach statistical significance. These means are presented in Table 21.

While the means on the scale indicating interest in learning more about X-ray technology was higher for those subjects who worked on the X-ray Technician booklet than for those using other booklets, the differences due to occupation were not significant on this measure. The means by occupational group are given in Table 22.

TABLE 19

ANALYSIS OF VARIANCE OF SELF-RATINGS OF INTEREST IN X-RAY TECHNOLOGY

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	F
1 Grade Level	1	1.34	1.34	.62
2 Ability Level	2	3.23	1.62	.75
3 Occupation	2	9.15	4.57	2.12
4 Difficulty Level	2	.48	.24	.11
1 x 2	2	3.79	1.89	.88
1 x 3	2	5.59	2.80	1.30
1 x 4	2	3.81	1.91	.89
2 x 3	4	6.88	1.72	.80
2 x 4	4	2.21	.55	.26
3 x 4	4	7.80	1.95	.91
1 x 2 x 3	4	7.66	1.91	.89
1 x 2 x 4	4	6.10	1.52	.71
1 x 3 x 4	4	3.46	.86	.40
2 x 3 x 4	8	6.34	.79	.37
1 x 2 x 3 x 4	8	14.62	1.83	.85
Within Replicates	162	348.75	2.15	
Total	215	431.22		

TABLE 20

MEAN SELF-RATINGS OF INTEREST IN X-RAY TECHNOLOGY BY DIFFICULTY LEVELS

Difficulty Level	N	Mean*
Easy	72	2.46
Moderate	72	2.38
Difficult	72	2.49

*Differences between means not significant, p > .10

TABLE 21

MEAN SELF-RATINGS OF INTEREST IN X-RAY TECHNOLOGY BY DIFFICULTY LEVEL AND ABILITY LEVEL

Difficulty Level		Ability Level				
		Low		Middle		High
	N	Mean	N	Mean	N	Mean
Easy	24	2.58	24	2.21	24	2.58
Moderate	24	2.24	24	2.38	24	2.54
Difficult	24	2.33	24	2.41	24	2.71

*Interaction not significant, $p > .10$.

TABLE 22

MEAN SELF-RATINGS OF INTEREST IN X-RAY TECHNOLOGY BY OCCUPATION

Occupation	N	Mean*
Med Lab Technician	72	2.40
X-Ray Technician	72	2.71
Sales	72	2.21

*Differences between means not significant, $p > .10$.

The failure of differences in means shown in Table 22 to reach significance was to some extent due to the apparent generalization in interest from the X-ray technologist booklet to the other two occupational fields. The X-ray booklet not only produced more interest in X-ray technology but it also produced more interest in sales than did the other two booklets. While the interest generated by the X-ray booklet in medical laboratory technology was not as great as that produced by the medical laboratory booklet itself, it was greater than that generated by any booklet in an occupation not the subject of the booklet.

Criterion Measure: Interest in Learning More About Occupations in General

The effect of difficulty was in the predicted direction, but the differences among means were extremely small and not statistically significant. Table 23 shows the results of the analysis of variance using interest in learning more about occupations in general as the criterion measure. The effect of difficulty was in the predicted direction, but the differences among the means were extremely small and not statistically significant. These means are presented in Table 24.

There was a significant effect due to ability level shown in Table 25.

Table 26 shows the means on this measure by difficulty and ability levels. The interaction between these two variables was not statistically significant.

TABLE 23

ANALYSIS OF VARIANCE OF SELF-RATINGS OF INTEREST IN LEARNING MORE ABOUT OCCUPATIONS IN GENERAL

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	F
1 Grade Level	1	4.17	4.17	1.69
2 Ability Level	2	15.15	7.57	3.06*
3 Occupation	2	5.68	2.84	1.15
4 Difficulty	2	.12	.06	.02
1 x 2	2	14.77	7.39	2.99
1 x 3	2	13.86	6.93	2.80
1 x 4	2	3.03	1.51	.61
2 x 3	2	17.05	4.26	1.72
2 x 4	4	11.02	2.75	1.11
3 x 4	4	19.24	4.81	1.95
1 x 2 x 3	4	4.19	1.05	.42
1 x 2 x 4	4	7.44	1.86	.75
1 x 3 x 4	4	6.61	1.65	.67
2 x 3 x 4	8	13.45	1.68	.68
1 x 2 x 3 x 4	8	24.92	3.11	1.26
Within Replicates	162	399.50	2.47	
Total	215			

*$p \leq .05$

TABLE 24

MEAN SELF-RATINGS OF INTEREST IN GENERAL OCCUPATIONAL INFORMATION BY DIFFICULTY LEVEL

Difficulty Level	N	Mean*
Easy	72	3.28
Moderate	72	3.32
Difficult	72	3.26

*Differences between means not significant, $p > .10$.

TABLE 25

MEAN SELF-RATINGS OF INTEREST IN GENERAL OCCUPATIONAL INFORMATION BY ABILITY LEVEL

Ability Level	N	Mean*
Low	72	3.22
Middle	72	3.00
High	72	3.60

*Differences between means significant, $p < .05$.

TABLE 26

MEAN SELF-RATING OF INTEREST IN GENERAL OCCUPATIONAL INFORMATION BY DIFFICULTY AND ABILITY LEVELS*

Difficulty Levels	Ability Levels Low N	 Mean	 Middle N	 Mean	 High N	 Mean
Easy	24	3.25	24	2.75	24	3.82
Moderate	24	3.41	24	2.82	24	3.71
Difficult	24	3.00	24	3.41	24	3.39

*Differences between means not significant, $p > .10$.

Interest in Learning More About Occupation Presented in Problem Booklet

The score made on the scale corresponding to the occupation presented in the problem booklet (own scale) for each subject was used in this analysis (Table 27).

TABLE 27

ANALYSIS OF VARIANCE OF SELF-RATINGS OF INTEREST IN LEARNING MORE ABOUT OCCUPATION PRESENTED IN THE PROBLEM BOOKLET

Source of Variation	Degrees of Freedom	Sums of Squares	Squares	F
1 Grade Level	1	.56	.56	.30
2 Ability Level	2	1.18	.59	.31
3 Occupation	2	28.51	14.25	7.62**
4 Difficulty	2	3.23	1.62	.87
1 x 2	2	7.12	3.56	1.90
1 x 3	2	6.29	3.14	1.68
1 x 4	2	.01	.00	.00
2 x 3	2	17.18	4.30	2.30
2 x 4	4	9.46	2.37	1.27
3 x 4	4	9.63	2.41	1.29
1 x 2 x 3	4	4.91	1.23	.66
1 x 2 x 4	4	6.35	1.59	.85
1 x 3 x 4	4	2.52	.63	.34
2 x 3 x 4	8	16.09	2.01	1.07
1 x 2 x 3 x 4	8	15.37	1.92	1.03
Within Replicates	162	302.25	1.87	
Total	215	430.66		

*$p \leq .001$

The effect of difficulty in attaining success was not statistically significant using this criterion measure. The means for each level of difficulty are presented in Table 28.

TABLE 28

MEAN SELF-RATING OF INTEREST IN LEARNING MORE ABOUT OCCUPATION PRESENTED IN PROBLEM-SOLVING BOOKLET BY DIFFICULTY LEVEL

Difficulty Level	N	Mean*
Easy	72	2.75
Moderate	72	2.51
Difficult	72	2.47

*Differences between means not significant, $p > .10$.

The trend indicated in the above table is not in the direction hypothesized.

Although no significant interaction was demonstrated in this analysis, the means for self-rated interest in the occupation presented in the booklet by ability and difficulty levels are presented for examination in Table 29.

TABLE 29

MEAN SELF-RATING OF INTEREST IN LEARNING MORE ABOUT OCCUPATION PRESENTED IN PROBLEM-SOLVING BOOKLET BY DIFFICULTY LEVEL AND ABILITY LEVEL*

Difficulty Level	Ability Levels Low N	Low Mean	Middle N	Middle Mean	High N	High Mean
Easy	24	2.91	24	3.45	24	2.47
Moderate	24	2.70	24	2.21	24	2.75
Difficult	24	2.25	24	2.37	24	2.79

*Differences between means not significant, $p > .05$.

The mean of the low and middle ability groups was higher with the easy treatment while for the high ability group the difficult treatment resulted in a higher mean.

The effect of occupation of the problem material used was statistically significant ($p < .01$) and these means are presented in Table 30.

TABLE 30

MEAN SELF-RATING OF INTEREST IN OCCUPATION PRESENTED IN BOOKLET BY OCCUPATION

Occupation	N	Mean*
Medical Lab Tech	72	2.94
X-Ray Tech	72	2.70
Sales	72	2.08

*Differences between means significant, $p < .001$.

The fact that the sales booklet dealt with verbal problems while the problems in the other two booklets were largely nonverbal may help account for the differences. The relatively nonverbal tasks may have had more appeal to the boys in this study.

The occupational differences cannot be explained by the actual differences in difficulty of achieving success on each booklet, for while more medical laboratory subjects achieved success, the X-ray technician group was least successful (see Table 6).

The differences might be explained by the degree of unusualness presented by each occupation. Berlyn's work indicates that interest is aroused by the uniqueness of a stimulus. Sales was perhaps the most familiar occupation of the three and thus did not generate the same interest.

Summary of the Results of Testing Hypothesis I

The hypothesis that the moderately difficult problems would generate more self-reported interest in learning about occupations was not supported on any of the measures used.

For low and middle ability ninth-grade subjects who worked on the sales booklet, the easy and moderate difficult levels produced more interest in sales than did the more difficult booklet. For eleventh-graders the easy and moderate difficulty levels generated more interest for all ability levels. This interaction supported Hypothesis IV which was not supported on other self-report measures of interest.

The booklets differed in their ability to generate occupational interest with the medical laboratory booklet producing the most interest and the sales booklet the least.

II. Results of the Test of Hypothesis II

To test the hypothesis that subjects working with the moderately difficult problem materials would have more knowledge of the occupation studied than would students working with problems in which success was difficult or easy to attain, a 2x3x3x3 analysis of variance was done using standardized scores from information tests in the three occupations. The results of this analysis are shown in Table 31.

TABLE 31

ANALYSIS OF VARIANCE OF INFORMATION TEST SCORES

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	F
1 Grade Level	1	1309.31	1309.31	16.03**
2 Ability	2	1403.20	701.60	8.59**
3 Occupation	2	11.03	5.51	.07
4 Difficulty	2	24.35	12.17	.15
1 x 2	2	455.91	227.95	2.79
1 x 3	2	143.71	71.86	.88
1 x 4	2	27.66	13.83	.17
2 x 3	4	419.10	103.77	1.27
2 x 4	4	416.13	104.03	1.27
3 x 4	4	49.01	12.25	.15
1 x 2 x 3	4	297.57	74.39	.91
1 x 2 x 4	4	730.62	182.65	2.24
1 x 3 x 4	4	256.43	64.11	.78
2 x 3 x 4	8	750.44	93.80	1.15
1 x 2 x 3 x 4	8	2019.73	252.47	3.09*
Within Replicates	162	13229.71	81.66	
Total	215	21539.91		

*p < .01.

**p < .001.

The differences in means due to grade level and to ability were highly significant and in the direction one would expect (Tables 32 and 33).

TABLE 32

MEAN INFORMATION TEST SCORES BY GRADE

Grade	N	Mean*
9	108	48.15
11	108	53.07

* Differences between means significant, $p < .001$.

TABLE 33

MEAN INFORMATION TEST SCORES BY ABILITY

Ability Level	N	Mean*
Low	72	48.32
Middle	72	49.34
High	72	54.16

* Differences between means significant, $p < .001$.

The effect of difficulty level was not statistically significant and the small differences which did occur were not in the hypothesized direction (Table 34).

TABLE 34

MEAN INFORMATION TEST SCORES BY DIFFICULTY LEVEL

Difficulty Level	N	Mean*
Easy	72	51.02
Moderate	72	50.19
Difficult	72	50.62

*Differences between means not significant, $p > .10$.

The significant main effects found in this analysis are confounded with a significant four-way interaction, grade level x ability x occupation x difficulty level. All cell means are presented in Table 35.

TABLE 35

MEAN INFORMATION TEST SCORES BY GRADE LEVEL, ABILITY, OCCUPATION, AND DIFFICULTY LEVEL *

Grade	Occupation	Difficulty Level	Ability Levels			Combined
			Low	Middle	High	
9		Easy	53.05	48.15	49.40	50.20
	Med. Lab Tech	Moderate	48.85	47.55	41.50	45.97
	47.72	Difficult	43.35	46.32	51.27	46.98
			48.42	47.34	47.39	
9		Easy	47.58	45.45	56.35	49.79
	X-Ray Tech	Moderate	40.55	47.02	55.62	47.73
	49.14	Difficult	51.60	47.02	51.10	49.91
			46.58	46.50	50.36	
9		Easy	38.40	51.20	49.98	46.53
	Sales	Moderate	56.98	45.45	48.02	50.15
	47.80	Difficult	52.52	37.75	49.92	46.73
			49.30	44.80	49.31	
			48.10	46.21	49.02	48.22
11		Easy	43.35	57.38	60.97	53.90
	Med.Lab Tech	Moderate	47.55	47.55	67.68	54.26
	54.15	Difficult	50.58	63.40	48.80	54.26
			47.16	56.11	59.15	
11		Easy	44.88	57.52	51.38	51.26
	X-Ray Tech	Moderate	50.10	46.22	59.18	51.83
	51.73	Difficult	47.50	51.68	57.75	52.10
			47.49	51.81	56.10	
11		Easy	57.00	52.48	53.78	54.42
	Sales	Moderate	51.88	44.80	56.98	51.22
	53.28	Difficult	46.08	51.20	65.30	54.19
			51.65	49.49	58.69	
			48.77	52.47	57.98	53.05
			48.32	49.34	54.16	50.63

*Significant interaction, $p < .01$.

In the 18 sets of means grouped by occupation, ability, and grade level, the easy treatment produced more knowledge of the occupation in 8 cases, the moderate treatment increased knowledge more in four cases, and the difficult treatment resulted in more knowledge in five cases.

Low and middle ability ninth-grade students who worked on problems in medical laboratory technology learned more about the occupation after working on the easy booklets while the difficult treatment increased knowledge more with high ability ninth-graders. This tendency was reversed among eleventh-grade subjects in the same occupational group.

For low ability ninth-graders, the difficult X-ray technician booklet produced more knowledge than the other two difficulty levels, but for high ability students in the same grade, the easy treatment increased knowledge more than did the moderate or difficult problems.

The moderate and difficult sales booklets increased knowledge of the occupation more than did the easy treatment for low ability ninth-graders. The reverse was true for the moderate ability ninth-grade students using the sales booklets, and no differences were apparent among the high ability sales group at this grade level.

Among the low and middle ability eleventh-grade students using the sales booklets, the easy treatment increased knowledge more than did the other two difficulty levels. The difficult treatment increased knowledge more for the high ability eleventh-graders working on the same occupation.

Summary of Results of Testing Hypothesis II

The hypothesis that students receiving a problem kit in which success is moderately difficult to attain will increase their knowledge of that occupation more than will those who receive kits in which success is difficult or easy to attain was not supported.

Hypothesis IV which predicted an interaction between difficulty level and ability was not supported using the information test score as a measure. Rather than a simple interaction between ability and difficulty level, information gained about the occupation studied was influenced by ability and grade level, and this influence differed for each occupation and difficulty level.

III. Results of the Test of Hypothesis III

It was hypothesized that subjects using the moderately difficult problem materials would engage in more information-seeking when presented with opportunities to do so than would subjects from the other two groups. Five opportunities were presented to each subject to seek further occupational information. The number of positive responses to these opportunities were combined to use in the analysis to test the hypothesis. Prior to the experiment and based on previous experience it was assumed that more subjects would sign up to work on another booklet, write a question seeking further information and mail a post card for information than would request materials at the library or request to see a counselor. Since the responses to the five opportunities were not equally likely, it was decided to use a weighted combination rather than a simple total.

To establish weights, data collected from 412 girls who used the problem-solving and control booklets and were given the same five opportunities to seek further information were analyzed. The response frequencies for this group are displayed in Table 36.

TABLE 36

RESPONSE FREQUENCIES TO FIVE OPPORTUNITIES TO OBTAIN OCCUPATIONAL INFORMATION

Girls N = 412*

Request to Use Another Booklet	Written Question	Request to See Counselor	Request for Library Materials	Post Card
309	141	5	6	72

*Subjects could respond to more than one opportunity or to none of them.

As was anticipated the response frequencies to the five opportunities were not equal. The responses to the opportunity to see a counselor and to request library materials were deemed too infrequent to be used in the analysis, and these items were given a weight of zero. The other three response categories were given weights to equalize them in order that they could be added for each subject and their total used in an analysis of variance. Weights were established by dividing each of the frequencies obtained in the female sample (see Table 36) into the highest frequency obtained. The resulting weights are displayed in Table 37.

Each positive response by subjects in the experiment to an opportunity was given the appropriate weight, and the total of these weighted responses for each individual was used in the analysis. The unweighted frequencies obtained for boys is displayed in Table 38.

TABLE 37

WEIGHTS APPLIED TO RESPONSES TO OPPORTUNITIES TO SEEK INFORMATION

Request to Use Another Booklet	Written Question	Request to See Counselor	Request for Library Materials	Post Card
1	2.19	0	0	4.29

TABLE 38

RESPONSE FREQUENCIES TO FIVE OPPORTUNITIES TO SEEK OCCUPATIONAL INFORMATION

Boys N = 377*

Request to Use Another Booklet	Written Question	Request to See Counselor	Request for Library Materials	Post Card
273	95	7	7	62

*Includes reserve subject pool and subjects dropped from experiment due to incomplete data.

The analysis of variance using the total of the weighted responses as the dependent variable is presented in Table 39. Differences in means due to difficulty level were extremely small, nonsignificant, and not in the direction indicated by the hypothesis. These means are given in Table 40.

Occupation was found to be a significant main effect at the .05 level. The means for this effect are shown in Table 41.

The interaction between grade and ability was significant at the .05 level, and the means for this interaction are presented in Table 42.

That the ninth- and eleventh-grade boys in this experiment enjoyed working on the simulated occupational problem booklets was indicated by the fact that 204 of the 273 subjects who worked on the problem booklets, including subjects in the reserve pool not used in the analysis of variance shown in Table 39, signed up to work on similar booklets in other occupations.

TABLE 39

ANALYSIS OF VARIANCE OF WEIGHTED COMBINATION OF OPPORTUNITIES TAKEN TO SEEK OCCUPATIONAL INFORMATION

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	F
1 Grade Level	1	1.35	1.35	.33
2 Ability	2	11.94	5.97	1.44
3 Occupation	2	31.03	15.51	3.76*
4 Difficulty	2	.15	.08	.02
1 x 2	2	33.00	16.50	3.99*
1 x 3	2	13.14	6.57	1.59
1 x 4	2	2.84	1.42	.34
2 x 3	4	5.54	1.39	.34
2 x 4	4	1.44	.36	.09
3 x 4	4	24.85	6.21	1.50
1 x 2 x 3	4	13.67	3.42	.83
1 x 2 x 4	4	10.68	2.67	.65
1 x 3 x 4	4	35.85	8.96	2.17
2 x 3 x 4	8	33.96	4.24	1.03
1 x 2 x 3 x 4	8	16.93	2.12	.51
Within Replicates	162	668.72	4.13	
Total	215	905.10		

*p < .05.

TABLE 40

MEAN WEIGHTED COMBINATION OF INFORMATION-SEEKING OCCURRENCES BY DIFFICULTY LEVEL

Difficulty Level	N	Mean*
Easy	72	1.98
Moderate	72	1.95
Difficult	72	1.92

*Differences between means not significant, p > .10

TABLE 41

MEAN WEIGHTED COMBINATION OF INFORMATION-SEEKING OCCURRENCES BY OCCUPATION

Occupation	N	Mean*
Medical Lab Tech	72	2.06
X-Ray Tech	72	2.36
Sales	72	1.45

*Differences between means significant, $p < .05$.

TABLE 42

MEAN WEIGHTED COMBINATION OF INFORMATION-SEEKING OCCURRENCES BY GRADE AND ABILITY *

Grade	Ability Levels Low N	 Low Mean	 Middle N	 Middle Mean	 High N	 High Mean
9	36	2.45	36	1.38	36	2.25
11	36	1.25	36	2.07	36	2.29

*Differences between means significant, $p < .05$.

While the requests to see counselor and the requests to use library materials were too infrequent to be of statistical importance, the frequency of the responses and the cells in which they occurred are displayed in Table 43.

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TABLE 43

FREQUENCY OF RESPONSES TO OPPORTUNITIES TO SEE COUNSELOR AND TO USE LIBRARY MATERIALS

			Ability Levels		
Grade	Occupation	Difficulty	Low	Middle	High
9	Med Lab Tech	Easy	L*		
		Moderate			
		Difficult			L
9	X-Ray Tech	Easy			
		Moderate	L		C**
		Difficulty			
9	Sales	Easy			
		Moderate			
		Difficult	L		
9	Control				
11	Med Lab Tech	Easy			L
		Moderate			
		Difficult			C
11	X-Ray Tech	Easy		L	
		Moderate			
		Difficult	C		C
11	Sales	Easy			
		Moderate		C	
		Difficult		C	
11	Control			C	L

*L = one request for library materials

**C = one request to see counselor

Of the seven requests to see a counselor, all but one came from eleventh-grade boys. The responses made by eleventh graders came largely from the middle and high ability groups.

Summary of Results of Testing Hypothesis III

The null hypothesis regarding an effect due to difficulty could not be rejected based on the results obtained using occurrences of information seeking as a dependent variable.

As was true with measures of expressed interest, measures of information-seeking revealed significant differences ($p < .05$) among the three occupations used in the problem-solving simulations. The means again favored the two health service occupations over sales. The factors responsible for these differences could not be identified in this study.

The hypothesized interaction between ability and difficulty levels was not supported by the analysis of this criterion measure.

IV. Results of Test of Hypothesis IV

Hypothesis IV predicted interactions between difficulty level and ability on all measures. The results of these tests of interactions have been reported along with the main effects tested for the first three hypotheses and will be summarized here.

While no first order interactions between ability and difficulty level was demonstrated using any of the criteria, on self-reported interest in sales and information test scores, ability and difficulty were found to interact with grade level and occupation of the booklet used. The easy and moderate difficulty levels produced more sales interest for low and middle groups of ninth-graders who worked on sales problems while the difficult kit produced more sales interest for the high ability group.

For eleventh-grade subjects using the sales booklet, the easy or moderate level produced higher interest in sales for all difficulty levels.

For low ability ninth-graders, the easy medical laboratory booklet, difficult x-ray booklet, and moderate or difficult sales booklet produced the highest information scores. For low and middle ability eleventh-graders, the easy sales booklet produced the highest scores.

V. Results of Test of Hypothesis V

Following the preceding analysis, the data was grouped by occupation, difficulty level, and subject's initial occupational interest. A 3x3x6 analysis of variance design with unequal cell frequencies resulted. The same dependent variables previously discussed were used for this design which was analyzed using program BMD05V from Biomedical Computer Programs (Dixon, 1965). This program allows one or more effects to be tested using a given criterion measure. However, when more than one effect is tested, the results are not independent when cell frequencies are unequal.

The hypothesized interaction between initial interest and difficulty level was tested on all criterion measures. The interaction was demonstrated on only one of the seven measures, information test scores.

In order to reduce the influence of ability on the outcome of the analysis using test scores as a measure, grade point average was used as a covariate. The analysis of covariance of information scores is shown in Table 44. The means for the significant interaction between initial interest and difficulty level are given in Table 45.

TABLE 44

ANALYSIS OF COVARIANCE OF INFORMATION TEST SCORES WITH GRADE POINT AVERAGE AS A COVARIATE

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F
Difficulty x Interest	17	3819.87	347.26	3.31*
Within replicates	138	14484.85	104.96	

*$p < .01$.

TABLE 45

MEAN INFORMATION TEST SCORES BY INITIAL INTEREST AND DIFFICULTY LEVEL*

	Difficulty Level					
	Easy		Moderate		Difficult	
Initial Interest	Mean	N	Mean	N	Mean	N
Realistic	51.15	15	53.05	12	47.27	10
Intellectual	49.82	14	53.44	12	54.51	14
Social	52.97	9	55.25	13	49.17	11
Conventional	57.27	7	46.35	11	51.14	9
Enterprising	52.92	11	46.67	6	50.16	12
Artistic	44.40	9	41.66	9	54.65	9

* Interaction significant, $p < .01$

The difficult kits produced higher information test scores than moderate or easy kits for those with intellectual and artistic interests. However, the moderately difficult kits resulted in higher scores for those with realistic and social interests. Higher scores for those with conventional or enterprising interests were produced by the easy problem kits.

Initial occupational interest was related to self-rated interest in medical laboratory technology and in sales but not to interest in x-ray technology. Initial interest, of course, was not randomly assigned, and the relation between it and criterion measures are correlational rather than causal. Table 46 - 48 present analyses of variance using initial interest as the source of variance and self-reported interest in each of the three occupations as criterion measures. Tables 49 and 50 give the means on measures in which significant differences did occur.

TABLE 46

ANALYSIS OF VARIANCE OF SELF-RATED INTEREST IN MEDICAL LABORATORY TECHNOLOGY

Source of Variance	Degrees of Freedom	Sums of Squares	Mean Squares	F
Initial interest	5	23.30	4.66	2.86*
Within replicates	139	226.66	1.63	

*p < .05.

TABLE 47

ANALYSIS OF VARIANCE OF SELF-RATED INTEREST IN SALES

Source of Variance	Degrees of Freedom	Sums of Squares	Mean Squares	F
Initial interest	5	12.60	2.52	2.60*
Within replicates	139	135.35	.97	

*p < .05

TABLE 48

ANALYSIS OF VARIANCE OF SELF-RATED INTEREST IN X-RAY TECHNOLOGY

Source of Variance	Degrees of Freedom	Sums of Aquares	Mean Squares	F
Initial interest	5	10.54	2.10	.99*
Within replicates	139	293.28	2.11	

*Not significant

TABLE 49

MEAN SELF-RATED INTEREST IN LEARNING MORE ABOUT MEDICAL LABORATORY TECHNOLOGY BY INITIAL OCCUPATIONAL INTEREST

Initial Interest	N	Mean*
Realistic	37	2.19
Intellectual	40	3.02
Social	33	2.57
Conventional	27	2.11
Enterprising	29	2.24
Artistic	27	2.26

*Differences between means significant, $p < .05$.

Table 50

MEAN SELF-RATED INTEREST IN LEARNING MORE ABOUT SALES BY INITIAL OCCUPATIONAL INTEREST

Initial Interest	N	Mean*
Realistic	37	2.11
Intellectual	40	1.45
Social	33	1.61
Conventional	27	1.59
Enterprising	29	2.21
Artistic	27	1.59

*Differences between means significant, $p < .05$.

V. Results of Testing the Hypothesis that Problem-Solving Groups Would Mail More Post Cards Requesting Occupational Information Than Would Control Groups.

The assumption was made that the interest which motivated sending the post card was a continuous variable normally distributed in spite of the fact that receipt of the post card or failure to receive the card measured the underlying phenomenon as a discrete variable. In order to use the receipt of post card in an analysis of variance design, the mean number of cards received per cell was used rather than individual observations. To simplify the preparation of the data for the analysis, the total number of post cards received per cell was actually used rather than the mean. This was possible without distorting the results because in this analysis, the N of each cell was equal. Table 51 presents the results of this test.

TABLE 51

ANALYSIS OF VARIANCE OF NUMBER OF POST CARDS RECEIVED

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	F
1 Grade	1	1.04	1.04	1.93
2 Ability	2	2.08	1.04	1.93
3 Treatment	3	1.45	.49	.91
1 x 2	2	13.08	6.54	12.11**
1 x 3	3	3.12	1.04	1.93
2 x 3	6	4.92	.82	1.52
Residual	6	3.25	.54	
Total	23	28.96		

**p < .001.

While the treatment effect did not reach statistical significance, the means for problem-solving at each of the three levels of difficulty were higher than that of the control treatment. These means are presented in Table 52.

TABLE 52

MEAN NUMBER OF POST CARDS RECEIVED BY TREATMENT

Treatment	Mean Number of Post Cards Received
Easy Problem-Solving	.36
Moderate Problem-Solving	.39
Difficult Problem-Solving	.33
Control (No Problem-Solving)	.28

The interaction between grade and ability was significant (p > .01) and the means for these two variables are presented in Table 53.

TABLE 53

MEAN NUMBER OF POST CARDS RECEIVED BY GRADE AND ABILITY*

Grade Level	Ability Levels Low N	Low Mean	Middle N	Middle Mean	High N	High Mean	Combined N	Combined Mean
9	36	.39	36	.14	36	.22	108	.25
11	36	.11	36	.22	36	.28	108	.20

*Interaction significant, $p < .01$.

A tally was made of the items requested by those subjects who mailed post cards. By checking appropriate boxes on the cards, the subjects could request information on medical lab technology, sales, X-ray technology, or general career information. More than one box could be checked. Table 54 presents the frequency of requests for each type of information by subjects grouped according to the occupation exposed to in the problem booklet. Control subjects are also included in this table.

TABLE 54

FREQUENCY OF POST CARD REQUESTS FOR VARIOUS TYPES OF OCCUPATIONAL INFORMATION

Subject Group	Type of Information Requested Med Lab Tech	X-Ray Tech	Sales	Gen. Info.	Total
Med Lab Tech	8	4	2	7	21
X-Ray Tech	2	11	1	8	22
Sales	4	5	5	6	20
Control	1	1	1	11	14
	15	21	9	32	77

The null hypothesis, that there was no association between the subject groups and the types of information requested was tested on the above 4x4 table using the Pearson χ^2 test of association described by Hayes (1963, pp.589-592). The computed χ^2 of 23.11 with 9 degrees of freedom was significant ($p < .01$) and the null hypothesis was rejected.

The type of booklet presented influenced the types of materials requested. The fact that the highest number of requests for each type of information came from subjects who used corresponding booklets, suggests that occupational problem-solving experiences can generate specific occupational interest.

Summary of the Results of Testing Hypothesis V

While problem-solving groups at each of three difficulty levels mailed more post card requests for occupational information than did the control group, this tendency was not strong enough to support the hypothesis that problem-solving materials would generate more information-seeking than would the control treatment. However, the type of information requested was significantly related to the booklet used. The highest number of requests for sales, x-ray technology and medical laboratory information were from students who worked in those respective booklets.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary

The general purpose of this investigation was to improve ways of motivating young people to explore their own career opportunities as a step in assisting them to make better vocational decisions. While developing decision-making ability is a widely accepted goal of counseling, there have been few experimental studies to shed light on how this might best be done.

The majority of the studies related to vocational choice have been correlational and have provided counselors with many factors related to vocational choice but with very little that they can do to encourage young people to explore opportunities, broaden interest, and see the alternatives available.

Recent research by Jones (1966), Sheppard (1967), and Krumboltz (1967) has demonstrated that procedures which provide young people with realistic though simulated occupational experiences do generate vocational interest and stimulate exploration. Before the results of this research can be effectively applied, much more needs to be known about how important subject and treatment variables affect the outcomes of this approach.

This present study was designed to investigate how simulated vocational problem-solving experiences could best be adapted for individuals of various abilities and with different initial occupational interests.

Through modifications in the structure of simulated occupational problem-solving materials developed in earlier research, this study attempted to determine the optimal difficulty level of the occupational problems for students with varying interests and ability levels.

Berlyne's work on the origins of exploratory behavior and his identification of the problem of optimal difficulty level serve as a theoretical foundation for this research. According to Berlyne, the presentation of a problem or question arouses epistemic curiosity which leads to exploration which is in turn reinforced by information.

In this study subjects were presented with simulated vocational problems in sales, medical laboratory technology and X-ray technology, given the information necessary to solve the problems, then given an opportunity to compare their answers with the correct ones and to determine whether or not the number of correct answers achieved met the criterion of a successful performance. The criterion for success was set at three levels of difficulty, easy to attain, moderately difficult, and very difficult to attain. Each subject received in a random fashion a problem in one occupation and at one of the three levels of difficulty.

The subjects were 288 ninth and eleventh grade boys from a school serving a working to lower middle class community. The subjects were classified into three ability groups based on grade point averages.

The experimental treatment consisted of having each student work through one of the problem booklets during a 55-minutes social studies period, correcting his responses to the problems presented, and determining whether or not he had met the criterion for a successful performance. The entire treatment was contained in the problem-solving booklets.

The treatment variables were occupation dealt with in the booklet and level of difficulty in achieving success. The subject variables were grade level, ability as determined by grade point averages, and initial occupational interest patterns as measured on the Holland Vocational Preference Inventory.

Criterion measures of three types were taken. Expressed interest in learning more about certain occupations including the three occupations dealt with in the booklets, scores on an information test covering the occupation simulated by the booklet, and incidents of information-seeking during the week following treatment were all used as dependent variables.

It was hypothesized that the subjects working under conditions in which success was moderately difficult to attain would achieve higher scores on all criterion measures than would those working under the easy or difficult conditions.

Of special interest in this study were the effects due to interactions between ability and difficulty levels and between initial occupational interest and difficulty.

A 2x3x3x3 factorial analysis of variance was used to test the hypothesis regarding the effects of difficulty level using each of the criterion measures in a separate analysis. All significant interactions were examined.

A 3x3x6 factorial analysis of variance was used to test the effects of initial interest using expressed interest and occurrences of information-seeking as criterion measures, and a 3x3x6 factorial analysis of covariance was used to test the effect of initial occupational interest using scores on a test of occupational information as the dependent variable and grade point average as a covariate. The interactions between initial interest and difficulty level were examined.

While there were some trends favoring the moderate level of difficulty over the two extremes and others favoring the easy treatment over the more difficult, the differences were not statistically significant at the .05 level on any of the criteria.

The hypothesized interaction between ability and difficulty level was not statistically significant on any of the criteria used. Difficulty level did play a part in significant four-way interactions with ability, grade level, and occupation in two of the seven tests for these interactions.

The hypothesized interaction between difficulty level and initial interest was significant at the .01 level using scores on the occupational information test as a measure.

Findings

1. On the average, students receiving problem-solving kits in which success was moderately difficult to attain did not significantly indicate more interest in the vocation studied, gain more information about the occupation, or take advantage of more opportunities to seek further vocational information than did students who received kits in which success was either difficult or easy to attain.

2. As hypothesized, difficulty level did significantly interact with initial occupational interest when knowledge of the occupation studied was used as a measure. Difficult kits produced higher information test scores for those with intellectual and artistic interests, moderately difficult kits generated higher scores for those with realistic and social interests, and the easy problem kits resulted in higher scores

for subjects with conventional or enterprising interests. The exact nature of these interactions was not hypothesized in advance and needs to be verified in future research. These interactions between initial interest and difficulty level were not found on other measures.

3. Difficulty level as manipulated in this study was not found to interact significantly with ability alone, but two significant third-order interactions were found on interest in sales and on occupational information.

Because the nature of these interactions was not hypothesized in advance, because the two were not consistent with each other, and because they occurred in only two of the seven tests for such interactions, the possibility that they were random occurrences cannot be rejected without further research.

4. Although subjects who worked on problem-solving booklets in each of the three occupations mailed more post card requests for occupational information than did the control subjects, the differences did not reach statistical significance.

5. Interest in an occupation was generated by problem-solving kits in that occupation. Interest in laboratory technology was significantly greater for those students exposed to problem booklets in that field than for students exposed to the other two fields. Interest in sales was significantly greater for those exposed to the sales booklet. The results were in the same direction for the X-ray technology booklet but did not reach the .05 level of significance. This finding that specific occupational interests can be generated by simulated occupational experiences is in agreement with the results of research by Jones (1966,

Sheppard (1967), and Krumboltz (1967).

6. Also supporting the efficacy of occupational simulation in generating specific occupational interests was the finding that the largest number of post card requests for information in each of the three occupational fields came from subjects exposed to the corresponding occupational problem booklet.

7. A statistical significant outcome of this research not hypothesized in advance was a difference between occupations. The laboratory technologist and X-ray technician booklets produced more information-seeking than did the sales booklet. Whether differences were due to the nature of the occupations themselves, the particular problems dealt with, the manner of presentation, or other factors could not be determined in this study.

8. Most students reacted favorably to the experience of working on the occupational booklets. Of the 284 students in the total subject pool who worked on the simulated problems, 204 requested to work on other problem-solving occupational booklets.

Limitations

In order to properly interpret the results and implications of this investigation, it is necessary to examine some of the limitations inherent in the procedures employed.

1. Treatment Conditions. All treatments were conducted simultaneously in a given classroom. Subjects working at different occupational problems worked side by side. It frequently occurred that two subjects seated next to each other worked on problems which were the same but

which required different levels of performance to meet the criterion of success. While an attempt was made to keep subjects working independently, it was not possible in the classrooms to keep subjects from being aware of the kinds of problems on which others were working. Nor was it always possible to keep subjects from exchanging information during the treatment period, and of course, there was no restraint against subjects exchanging information after the treatment periods.

The possibility of seeing other treatments and of exchanging information on success criterion levels might have acted to make the treatments less distinct from one another, and thus might have reduced the differences found on criterion measures.

Control subjects may have had their curiosity and interest aroused by observing other subjects at work on problem-solving materials.

2. Strength of Treatment. The total treatment took 55 minutes. The problems encountered during that time by subjects in any one occupational group were identical. Only during the last five minutes were scores added and compared to criterion standards. At that point subjects learned whether or not their performances could be called successful. That this one piece of information would influence behavior, in some cases one week later, was expecting a great deal. Perhaps continuous feedback on performance compared with a standard throughout the booklet would have been a more powerful treatment to test the influence of difficulty level.

3. Treatment Materials. The three occupations were presented in the same general format, but there were differences in length of time required to finish the problems, in amount of reading required, in the

number of questions to be answered, and in the type of problems encountered. How influential any of these variables were in producing the occupation effect is unknown.

4. Subject Readiness. Using information seeking as a measure of vocational interest generated assumes that students once interested in an occupation see a need for information, have some idea of what information to look for, and know how to go about finding it.

One possible explanation for the low incidence of request to see a counselor or requests for library materials may have been lack of student experience in using these resources in behalf of their own interests.

5. Subjects. The school from which the subjects were chosen and randomly assigned to treatments was one thought to be typical of a lower middle-class community. Generalizations to other school populations should be made with caution.

6. Difficulty Levels. The difficulty levels used as treatment variables were not randomly selected. Three difficulty levels were defined and used as a fixed effect in the analyses of variance presented in this study. The generalizations one can make from this fixed effect model are limited to the three difficulty levels defined.

Difficulty was defined as the number of correct responses necessary to achieve success and not as the probability of correctly solving a given problem. All problems sets in one occupation were identical. Only the number of correct responses necessary for success were different. Difference results might have been obtained had the three groups worked on problems of different difficulty with the criterion score the same for all groups.

Implications and Suggestions for Further Research

1. Task difficulty may be variously defined. As used in this study, it was related to the probability of achieving a given criterion score: the lower the probability, the greater the difficulty. Difficulty manipulated by varying criterion scores had no measurable main effect on the criteria used. While this finding fails to support Berlyne's conclusion that difficulty is an influential variable, it may be that the reason for this failure lies in the manner in which the variable was manipulated. Further research is suggested to test the effects of varying difficulty in other ways. The same criterion score might be used for all occupation problem sets, and the difficulty of the problems themselves varied. In research of this kind an effort should be made to equalize the number of problems presented in each set to be compared and to include enough problems in each set so that difficulty levels comparable across problem sets can be reliably determined.

2. This study can offer no firm recommendations as to the preferred difficulty level of simulated occupational problems except to say that the small non-significant differences observed did generally favor the moderate or easy treatments rather than the more difficult one. On this basis and until further research more clearly defines the effect of difficulty, it would seem best, for most students, to present simulated occupational problems at an easy or moderately difficult level.

Some of the interactions, however, suggest that there may be some groups of students for whom more difficult levels have beneficial effects. For example, students with artistic or intellectual interests learned more about the occupation studied having had the difficult booklets. The occupations included in these two interest categories are creative ones in science and the arts. That individuals with these interests would be challenged and motivated more by a difficult task seems to be a reasonable assumption and one which warrants further research and confirmation.

3. Kitson (1942) has called for counselors to help students to develop occupational interests. Simulated vocational experiences show promise of offering counselors a way of effectively doing this. Further research on the development and use of occupational simulation materials is strongly recommended.

The differences found in the effectiveness of the three occupational problem booklets used in this study suggest the need for further investigation of treatment variables.

A treatment variable of interest to future research would be the degree to which the simulated problem approximates the actual job task. Is it important to approximate closely the task or can simulation be symbolic? If the symbolic mode is effective, it is possible to produce simulations on more occupations than might be practical if the actual task must be closely approximated.

Further research along the lines of this study should better isolate treatments so that subjects will not be affected by treatments other than their own. Failure to control this factor was thought to have made actual differences less pronounced or perhaps to have hidden some differences altogether.

4. The notion of stability of vocational interests is in large part due to the voluminous research done with the Strong Vocational Interest Blank.

An alternate assumption that measured interest stability is due at least in part to the consistency of the occupational stereotype is a suggested topic for future research. Of considerable interest would be the effect on SVIB profiles of a persuasive communication aimed at changing the stereotype of an occupational field held by members entering or actually in the field.

5. Although grade level differences were not hypothesized, the fact that the ability of problem materials to generate vocational interest was the same for ninth-grade and eleventh-grade boys suggests that developmental stages in vocational maturity may not be important in stimulating vocational interest and exploration. Further research at various age or grade levels would be necessary to test this.

Research on the development of vocational choice and the stability of vocational interests have been descriptive. That interests normally develop through certain stages occurring at certain ages and remain relatively stable throughout maturity, even if true, does not rule out the possibility that a deliberate attempt to develop new vocational interests at any age level might not succeed.

The descriptive statement that vocational interests are stable should not be taken to mean that they cannot or should not be changed. Just how amenable to change vocational interests are at different age levels is suggested here as an important area of investigation especially in light of the need to retrain adult workers to keep up with changing technology.

6. A general implication of this research is that there are possibilities for the guidance counselor to help students before problems occur by

assisting them to develop skills in problem-solving. Vocational planning offers an excellent opportunity to do this both because career choice is a problem of some concern to most students and because it is a problem of gradually increasing concern which can be dealt with before anxiety, which accompanies many problems brought to counselors, interferes with effective learning.

This approach to counseling views the counselor's role as one which includes developing learning experiences designed to prevent problems. It suggests that the school counselor take a more active part in the school's instructional program. Counselors cannot rely on student initiative to seek information relevant to career planning. Of the 377 students in the subject pool in this experiment, all of whom were encouraged to see their counselors for vocational information and all of whom were given forms on which they could request a counseling interview, only seven students responded. Were 370 of these students just not interested in vocational information? On the contrary, 273 of these students requested to work on other occupational booklets, 95 submitted written questions concerning their occupational plans, and 62 of these students took the trouble to fill out and mail a post card requesting occupational information.

Students do want help with career planning, but that help must be of a kind which generates enthusiasm for exploration while providing a sound basis for decision.

APPENDIX A

Answer Forms

NAME

REPORT FORM

MEDICAL LABORATORY TECHNOLOGIST

Practice Problem 1

☐ A.
☐ B.
☐ C.
☐ D.

Practice Problem 2

☐ A.
☐ B.
☐ C.
☐ D.

Practice Problem 3

☐ A.
☐ B.
☐ C.
☐ D.
☐ E.

Practice Problem 4

☐ A.
☐ B.
☐ C.
☐ D.
☐ E.

Practice Problem 5

	Cells	Totals
☐	Segmented Neutrophils	
☐	Lymphocytes	
☐	Stabs	

LABORATORY FORM

Patient's Name

Doctor

HEMATOLOGY

☐ Red Cell Count
☐ Hemoglobin
☒ Dif White Count

Cells	Views						Total	%
	1	2	3	4	5	6		
Seg. Neutrophils								
Lymphocytes								
Stabs								
Totals							20	100

Technologist (Your Name)

QUESTIONS

☐ 1.
☐ 2.
☐ 3.
☐ 4.
☐ 5.
☐ 6.
☐ 7.
☐ 8.
☐ 9.
☐ 10.

☐ TOTAL

When you have finished these ten questions, check your answers with those found on page 36 of this booklet.

You were successful in this job as a MEDICAL TECHNOLOGIST if you scored a total of 8 or more.

Were you successful? Yes ☐ No ☐

If you were successful, you will probably want to find out more about this job or about other of the health service occupations.

(over)

NAME________________________________

MEDICAL X-RAY TECHNICIAN
REPORT FORM

When you have read the booklet and are ready to answer the questions at the end, use this answer sheet. Do not write in the booklet.

PART I

☐ Problem 1 Dr.______________________________
☐ Problem 2 Dr.______________________________
☐ Problem 3 Dr.______________________________

Check your answers with those found on page 21 of the booklet.

Were you successful on PART I? ☐ Yes ☐ No

Now read the directions for PART II in the booklet.

PART II

☐ Problem 4
☐ Problem 5
☐ Problem 6
☐ Problem 7

Check your answers with those found on page 23 of the booklet.

Were you successful on PART II? ☐ Yes ☐ No

Now read the directions for PART III in the booklet.

PART III

☐ Problem 8
☐ Problem 9
☐ Problem 10

Check your answers with those found on page 25 of the booklet.

Were you successful on PART III? ☐ Yes ☐ No

How well did you do as an X-RAY TECHNICIAN? Count the total number of pluses on all three parts (ten problems).

Record the TOTAL HERE ☐ TOTAL

If you have a total or 8 or more, you have successfully completed a typical job performance by MEDICAL X-RAY TECHNICIANS.

Were you successful as an X-RAY TECHNICIAN? ☐ Yes ☐ No

(over)

SALES ANSWER FORM

Name______________________________________ Date______________

1. ________ ( )
2. ________ ( )
3. ________ ( )
4. ________ ( )
5. ________ ( )
6. ________ ( )

Total # 1-6 [ ]

7. ________ ( )
8. ________ ( )
9. ________ ( )
10. ________ ( )
11. ________ ( )
12. ________ ( )
13. ________ ( )

Total # 7-13 [ ]

14. ________ ( )
15. ________ ( )
16. ________ ( )
17. ________ ( )

18.

Name______________________________________
Address______________________________________
Referred by______________________________________
Important information: ______________________________
____
Interests: ______________________________________
______________________________ Number of plus marks ( )

19. ________________ ( ) ________________ ( )
________________ ( ) ________________ ( )
________________ ( ) ________________ ( )

20. ________ ( )

21. a.) Of Interest: b.) NOT of Interest:

________________ ( ) ________________ ( )
________________ ( ) ________________ ( )
________________ ( ) ________________ ( )

22.

Name______________________________________
Address______________________________________
Referred by______________________________________
Important information: ______________________________
____
Interests: ______________________________________
______________________________ Number of plus marks ( )

23. ________ ( )

24. ______________________________________
____
____
____
____
____
____
____
______________________________ Number of plus marks ( )

25. ________________ ( ) Total #14-25 [ ]

TOTAL NUMBER OF PLUS MARKS YOU HAVE EARNED ☐ 40 IS A VERY GOOD SCORE

Would you like to know more about sales work?

Yes ______ No ______ Not sure ______

OVER →

APPENDIX B

Control Treatment Answer Form

Date________________ Print Name:________________________________
First Last

SURVEY FORM

The following questions have to do with your interests and abilities. Your replies will be treated confidentially and will **not** become a part of your school record. Please be open and honest in answering the questions.

For each of the words or statements in the following sections, you are to make a single choice by writing, in the space provided, the **letter** of the word or statement that **best** expresses your feelings.

1. If you were to choose your vocation now, how much would you enjoy each of the following types of work?

A. Definitely enjoy
B. Usually enjoy
C. Sometimes enjoy
D. Seldom enjoy
E. Definitely do not enjoy

1. Group activity ____
2. Meeting new people ____
3. Seeking out new experiences ____
4. Activities involving authority ____
5. Influencing and directing others ____
6. Working with ideas ____
7. Being my own boss ____
8. Working with my hands ____
9. Working outdoors ____
10. Working for a large company ____

2. Rate yourself on your school ability — not on your grades, but rather how capable you **really** feel you are.

A. Superior ability
B. A good deal of ability
C. Average ability
D. Some ability
E. Little ability

1. English subjects ____
2. Math subjects ____
3. Business subjects ____
4. Science subjects ____
5. Social subjects ____
6. Overall ability ____

3. Here is a list of some personal characteristics that are necessary for success on the job, which was developed by several groups of high school students.

A. Always
B. Usually
C. Sometimes
D. Seldom
E. Never

I see myself this way

1. Friendly ____
2. Cheerful ____
3. Pleasant ____
4. Reliable ____
5. Thorough ____
6. Neat ____
7. Confident ____
8. Helpful ____
9. Ambitious ____
10. Persistent ____
11. Patient ____
12. Enthusiastic ____

OVER ⟶

APPENDIX C

Interest Inventory

Name______________________________

How much interest do you have in learning more about the following occupations?

DIRECTIONS: For each occupation chech the box which best indicates how interested you would be in learning more about the occupation.

SPECIFIC OCCUPATIONS:	I want very much to learn as much as possible about this	I want to learn a great deal about this	I would like to learn about this	I might like to learn something about this	I do not wish to learn any more about this
Scientist					
Mechanic					
Medical Lab Tech					
Policemen					
Electronic Tech					
Appliance Repair					
Salesman					
Teacher					
X-Ray Tech					
Social Work					
GENERAL OCCUP. INFORMATION					

APPENDIX D

Post Card

Please send me the career information checked below:

Careers in Sales

Careers in X-Ray Technology

Careers in Medical Lab Technology

Career Opportunities (covers a variety of occupations)

PLEASE PRINT: Your Name and Address

____

____

____

Stamped Post Card
Addressed to Stanford University
School of Education

APPENDIX E

Request to See Counselor Form

SPECIAL

REQUEST TO SEE COUNSELOR

NAME ______________________________

I would like information in the following areas:

occupations ____________________

vocational training

college

If you want information on occuptions or training programs, fill this out and place it in the box on the counselors' table in the library.

APPENDIX F

Request to Work on Additional Booklets and Vocational Question Form

Occupational booklets like the one you just finished are availbale on several different occupations. You will be given another opportunity to use these booklets if you sign up here.

Check One

☐ I would like to use another occupational booklet.

☐ I don't wish to use another occupational booklet.

____

Signature

There will be a vocational counselor from Stanford University to talk with students next week. He will answer questions and provide occupational information of interest to you.

What questions do you have about specific occupations or about career planning in general that you would like to have answered?

APPENDIX G

Request for Library Material Form

REQUEST FOR OCCUPATIONAL INFORMATION

If you would like to use any of the materials displayed here when they become available one week from now, circle the numbers corresponding to the items you wish to have.

I. SPECIFIC OCCUPATIONS (Circle items desired.)

Items 1 2 3 4

On what specific occupation would you like this material?

____

II. OCCUPATIONAL FIELDS (Circle items desired.)

Items 5 6 7 8

III. GENERAL VOCATIONAL INFORMATION (Circle items desired.)

Items 9 10 11 12

PLEASE PRINT YOUR NAME ____________________ GRADE ________

APPENDIX H

More About Occupations

MORE ABOUT OCCUPATIONS

If you would like more information about the occupation you have read about in the booklet or about any other occupation, here are three suggestions . . .

SUGGESTION ONE

Fill out and mail the post card you were given. In two or three weeks you will receive the information you checked on the card.

SUGGESTION TWO

Fill out the request to see your counselor and place it in the special box on the counselors' table in the library. The table is to your right as you enter the library. Your counselor has occupational information on a variety of vocations as well as information on college and vocational training programs. He can tell you some of the requirements and the courses you should take now to prepare.

SUGGESTION THREE

Go to the school library and look at the occupational information on display there this week and next. If you are interested in using any of the materials on display, sign up using the form which is available at the display.

APPENDIX I

Sample Fact Sheet

Occupational
FACT
SHEET

MEDICAL LABORATORY TECHNOLOGIST

THE JOB

Medical technologists are laboratory workers who perform a wide variety of chemical, microscopic, and bacteriological tests to aid physicians in the detection, diagnosis, and treatment of disease.. Medical technologists usually work under the direction of a pathologist (a physician who specializes in the causes of disease). Whether working in a hospital or a medical laboratory, the technologist usually spends some time in direct contact with patients and doctors and the remainder of the day using microscopes and other laboratory equipment. Most medical lab technologists work in hospital laboratories. Others are employed in private laboratories or public health facilities. While the majority of lab technologists are now women, the field is rapidly attracting men.

DUTIES

In a hospital, the medical technologist might begin his work day by taking blood samples from patients, running tests as requested by the doctor, and preparing chemicals used in various laboratory tests. Activity in the laboratory will generally include blood counts, pregnancy tests, cross-matching of blood types for transfusions, etc. When a patient is brought into the emergency room in a coma, it is the technologist who will assist the physician in determining whether the patient is diabetic, drunk, or perhaps the victim of a heart attack. In cases of suspected cancer, medical technologists must sometimes prepare slides from sample tissue and body cells during an operation.

In small laboratories the technologist may perform many different types of tests. Technologists employed in large laboratories usually specialize even though they are qualified to work in various fields of laboratory science. Making mathematical calculations and writing reports of test findings are also part of the technologist's responsibilities. The technologist uses electronic equipment like the Coulter Counter which can count 7,000 to 10,000 blood cells per second.

THE PAY AND HOURS

Salaries for newly licensed technologists in most hospitals and laboratories in California are generally between $475 and $530 per month. An experienced technologist in a supervisory position may earn as much as $600 to $870 per month. The average yearly earnings of medical technologists in the United States in 1960 was $5561. Technologists usually work a 40 hour week. Some hospitals pay 10 to 15 percent more for night shifts.

OPPORTUNITIES FOR PROMOTION

While advancement is limited in a small clinic, technologists employed in a large laboratory may be promoted to a supervisory position directing the work of other technologists. With the added responsibilities of a chief technologist goes an increase in salary.

ENTRANCE REQUIREMENTS

The fastest growing occupations are the ones requiring the most education. One can be employed in a medical laboratory as a lab helper or lab assistant with a high school education or less, but medical technologists must have college training. California is one of four states requiring medical laboratory technologists to be licensed. Licensed technologists must have at least three years of college plus an internship in a medical laboratory.

HOW TO TRAIN

The time to start planning for a career in medical technology or for any career is now. The high school student thinking of a career as a medical technologist should follow a program that emphasizes science and math. The ability to type will prove useful. San Jose State College is one of many colleges with a program for medical laboratory technologists.

EMPLOYMENT OUTLOOK

There are approximately 40,000 medical technologists in hospitals in the United States. Employment prospects for the technologist are good. The supply is not keeping up with demand in California. Throughout the nation generally, licensed technologists have no difficulty in finding employment. Automation in the laboratory is not expected to reduce the need for technologists. The future will see an increased need for skilled technolgists to operate and maintain the automated equipment.

FURTHER INFORMATION

For further information on medical laboratory technology see the book, OCCUPATIONAL OUTLOOK HANDBOOK, which is available in the school library.

For additional information on medical laboratory technology see:

1. your counselor
2. a science teacher
3. the school nurse
4. someone at the U.S. Office of Employment

APPENDIX J

Occupational Information Tests

- Medical Laboratory Technology
- X-Ray Technology
- Sales

MEDICAL LABORATORY TECHNOLOGIST

INFORMATION TEST

PRINT-Last Name **First Name**

DIRECTIONS: Place an X in the box corresponding to the correct answer for each question. The correct answers are from the FACT SHEET which you have read.

1. a ☐ b ☐ c ☐ d ☐

1. The medical technologist's work brings him in contact with
   - a. microscopes and other lab equipment, but not people.
   - b. doctors and other hospital workers, but not patients.
   - c. both doctors and patients.
   - d. patients and hospital workers, but not doctors.

2. a ☐ b ☐ c ☐ d ☐

2. The number of medical laboratory technologists working in hospitals in the United States is
   - a. 25,000.
   - b. 40,000.
   - c. 50,000.
   - d. 65,000.

3. a ☐ b ☐ c ☐ d ☐

3. Beginning medical technologists generally earn a monthly salary of
   - a. $240-$350.
   - b. $300-$425.
   - c. $375-$475.
   - d. $475-$530.

4. a ☐ b ☐ c ☐ d ☐

4. Chief technologists may earn a monthly salary up to
   - a. $594.
   - b. $625.
   - c. $740.
   - d. $870.

5. a ☐ b ☐ c ☐ d ☐

5. A normal work week for a medical technologist is
   - a. 30 hours.
   - b. 40 hours.
   - c. 44 hours.
   - d. 48 hours.

6. a ☐ b ☐ c ☐ d ☐

6. How much education is required to become a lab helper?
   - a. high school or less
   - b. 2 years of junior college
   - c. 3 years of college
   - d. 5 or 6 years of college

7. a ☐ b ☐ c ☐ d ☐

7. Which of the above answers (Question 6) is the minimum educationa requirement for a licensed medical technologist?

8. a ☐ b ☐ c ☐ d ☐

8. Which of the following high school courses was not mentioned as one important to future lab technologists?
   - a. math
   - b. typing
   - c. business
   - d. science

9. a ☐ b ☐ c ☐ d ☐

9. Mentioned as having a training program in medical laboratory technology was
   - a. University of California.
   - b. San Jose State College.
   - c. San Jose City College.
   - d. Foothill College.

10. a ☐ b ☐ c ☐ d ☐

10. Which of the following is true of medical lab technology?
    - a. Nearly all technologists are men.
    - b. Fewer men are interested in lab technology than ever before.
    - c. Most technologists now are women but increasing numbers of men are entering the occupation.
    - d. Men and women are equally represented in the field.

11. a ☐ b ☐ c ☐ d ☐

11. The opportunities for employment of licensed medical technologist today are
    - a. doubtful.
    - b. poor.
    - c. fair.
    - d. good.

12. a ☐ b ☐ c ☐ d ☐

12. The opportunities for employment of licensed medical technologi in the furture is expected to be
    - a. doubtful.
    - b. poor.
    - c. fair.
    - d. good.

13. a ☐ b ☐ c ☐ d ☐

13. Automation in medical technology is expected to
    - a. be too far away to concern us.
    - b. increase the demand for technologists.
    - c. reduce the need for all technologists.
    - d. reduce the need for skilled technologists.

14. a ☐ b ☐ c ☐ d ☐ 14. Most medical technologists are employed in
a. private laboratories. c. private research institutions.
b. public health facilities. d. hospital laboratories.

15. a ☐ b ☐ c ☐ d ☐ 15. In a small medical laboratory the technologist generally
a. has more chance for advancement.
b. specializes.
c. performs a variety of lab tests.
d. relies more on electronic equipment.

16. a ☐ b ☐ c ☐ d ☐ 16. The physician who directs the lab in which the medical technologist works is a
a. pathologist. c. orthodpedist
b. radiologist. d. dermatologist

17. a ☐ b ☐ c ☐ d ☐ 17. Which of the following was not mentioned as a duty of the medical lab technologist?
a. taking blood samples c. writing reports
b. giving first aid d. performing laboratory tests

18. a ☐ b ☐ c ☐ d ☐ 18. In small clinics or laboratories the opportunities for advancement
a. do not exist.
b. are poorer than in a large clinic.
c. are better than in a large clinic.
d. are about the same as in a large clinic.

19. a ☐ b ☐ c ☐ d ☐ 19. Licensing is required of medical laboratory technologists in
a. California and most other states.
b. Most states except California.
c. California and a few other states.
d. A few states, but not California.

20. a ☐ b ☐ c ☐ d ☐ 20. The work of the medical lab technologist
a. requires increasing skills to keep up with technical changes.
b. requires less training because machines are doing much of the work.
c. generally does not involve technical equipment.
d. will soon be completely taken over by machines.

21. a ☐ b ☐ c ☐ d ☐ 21. The fastest growing occupations are those
a. requiring the least skills. c. requiring the least training.
b. requiring the most education. d. requiring the most physical strengths.

22. a ☐ b ☐ c ☐ d ☐ 22. The average yearly salary of medical lab technologists in the United States is approximately
a. \$4431 c. \$5123
b. \$4943 d. \$5561

23. a ☐ b ☐ c ☐ d ☐ 23. The best time to start planning for a career is
a. right now c. after graduation from high school
b. as a senior in high school d. after working a few years.

24. a ☐ b ☐ c ☐ d ☐ 24. Which of the following was not mentioned as a person to ask for further information about medical technology?
a. a lab technician c. a science teacher
b. a counselor d. a school nurse

25. a ☐ b ☐ c ☐ d ☐ 25. Which of the following library books was mentioned as one in which you could find additional information about medical lab technology?
a. OCCUPATIONAL OUTLOOK HANDBOOK c. VOCATIONAL PLANNING
b. CAREER GUIDE d. OCCUPATIONS IN HEALTH

MEDICAL X-RAY TECHNICIAN

INFORMATION TEST

PRINT- Last Name First Name

DIRECTIONS: Place an X in the box corresponding to the correct answer for each question. The correct answers are from the FACT SHEET which you have read.

1. a ☐ b ☐ c ☐ d ☐

1. The medical X-ray technician's work brings him in contact with
   a. X-ray tubes and other lab equipment, but not people.
   b. doctors and other hospital workers, but not patients.
   c. both doctors and patients.
   d. patients and hospital workers, but not doctors.

2. a ☐ b ☐ c ☐ d ☐

2. The number of X-ray technicians working in the United States is approximately
   a. 25,000. c. 50,000.
   b. 40,000. d. 60,000.

3. a ☐ b ☐ c ☐ d ☐

3. Beginning X-ray technicians generally earn an annual salary of
   a. $2500-$3200. c. $3400-$4000.
   b. $3000-$3600. d. $3600-$4800.

4. a ☐ b ☐ c ☐ d ☐

4. Chief technicians may earn an annual salary up to
   a. $7000. c. $9000.
   b. $8000. d. $10,000.

5. a ☐ b ☐ c ☐ d ☐

5. A normal work week for an X-ray technician is
   a. 30 hours. c. 44 hours.
   b. 40 hours. d. 48 hours.

6. a ☐ b ☐ c ☐ d ☐

6. How much education is required to become an X-ray technician?
   a. high school or less. c. 3 years of college
   b. 2 years beyond high school. d. 5 or 6 years of college

7. a ☐ b ☐ c ☐ d ☐

7. In order to use the title "registered Technician" a person must
   a. merely complete two years of training.
   b. complete two years of training and pass an examination.
   c. receive a degree from a four-year college.
   d. complete four years of college and pass an examination.

8. a ☐ b ☐ c ☐ d ☐

8. Which of the following high school courses was not mentioned as one important to future X-ray technicians.
   a. math c. business
   b. typing d. biology

9. a ☐ b ☐ c ☐ d ☐

9. Mentioned as having a training program in medical X-ray technology was
   a. University of California c. San Jose City College
   b. San Jose State College d. Foothill College

10. a ☐ b ☐ c ☐ d ☐

10. Which of the following is true of X-ray technology?
    a. Nearly all technologists are men.
    b. Fewer men are interested in X-ray technology than ever before.
    c. Most technicians now are women but increasing numbers of men are entering the occupation.
    d. Men and women are equally represented in the field.

11. a ☐ b ☐ c ☐ d ☐

11. The opportunities for employment of X-ray technicians today are
    a. doubtful. c. fair.
    b. poor. d. good.

12. a ☐ b ☐ c ☐ d ☐

12. The opportunities for employment of X-ray technicians in the future is expected to be
    a. doubtful. c. fair.
    b. poor. d. good.

13. a ☐ b ☐ c ☐ d ☐

13. Automation in X-ray technology is expected to
    a. be too far away to concern us.
    b. increase the demand for technicians.
    c. reduce the need for all technicians.
    d. reduce the need for skilled technicians.

14. a ☐ b ☐ c ☐ d ☐

14. The two major areas of work for the medical X-ray technician are
a. diagnostic and therapeutic. c. therapeutic and corrective.
b. diagnostic and exploratory. d. disease and injury.

15. a ☐ b ☐ c ☐ d ☐

15. Which of the following is not true of X-ray technicians?
a. He operates both stationary and mobile X-ray equipment.
b. He is often called into surgery to radiograph during an operation.
c. He is able to diagnose disease and recommend treatment.
d. He may specialize in dental X-ray, chest X-ray, or some other phase of the work.

16. a ☐ b ☐ c ☐ d ☐

16. The physician who directs the lab in which the X-ray technician works is a
a. pathologist. c. orthodpedist.
b. radiologist. d. dermatologist.

17. a ☐ b ☐ c ☐ d ☐

17. Which of the following was not mentioned as a duty of the medical X-ray technician?
a. preparing developing solutions
b. keeping records of services performed for patients
c. cleaning and taking care of the X-ray equipment
d. giving emergency first aid

18. a ☐ b ☐ c ☐ d ☐

18. In small clinics or laboratories the opportunities for advancement
a. do not exist.
b. are poorer than in a large clinic.
c. are better than in a large clinic.
d. are about the same as in a large clinic.

19. a ☐ b ☐ c ☐ d ☐

19. Licensing of X-ray technicians is
a. required in California and most other states.
b. required in most states except California.
c. required in California and a few other states.
d. not required.

20. a ☐ b ☐ c ☐ d ☐

20. The work of the X-ray technician
a. requires increasing skills to keep up with technical changes.
b. requires less training because machines are doing much of the work.
c. generally does not involve technical equipment.
d. will soon be completely taken over by machines.

21. a ☐ b ☐ c ☐ d ☐

21. The fastest growing occupations are those
a. requiring the least skills. c. requiring the least training.
b. requiring the most skills. d. requiring the most physical strengths.

22. a ☐ b ☐ c ☐ d ☐

22. Experienced X-ray technicians may earn an annual salary of
a. $4500 or less. c. $5500.
b. $5000 d. $6000 or more.

23. a ☐ b ☐ c ☐ d ☐

23. The best time to start planning for a career is
a. right now. c. after graduation from high school.
b. as a senior in high school. d. after working a few years.

24. a ☐ b ☐ c ☐ d ☐

24. Which of the following was not mentioned as a person to ask for further information about medical technology?
a. an X-ray technician c. a science teacher
b. a counselor d. a school nurse.

25. a ☐ b ☐ c ☐ d ☐

25. Which of the following library books was mentioned as one in which you could find additional information about medical X-ray technology?
a. OCCUPATIONAL OUTLOOK HANDBOOK c. VOCATIONAL PLANNING
b. CAREER GUIDE d. OCCUPATIONS IN HEALTH

PRINT-Last Name First Name

SALES
INFORMATION TEST

DIRECTIONS: Place an X in the box corresponding to the correct answer for each question. The correct answers are from the FACT SHEET which you have read.

1. a ☐ b ☐ c ☐ d ☐

1. Salesmen were described as the link between the manufacturer and
   - a. the salesmanager.
   - b. the advertising department.
   - c. people who use the product.
   - d. the product.

2. a ☐ b ☐ c ☐ d ☐

2. The number of workers engaged in sales in 1960 was approximately
   - a. 1-2 million
   - c. 3-4 million
   - b. 2-3 million
   - d. 4-5 million

3. a ☐ b ☐ c ☐ d ☐

3. Beginning retail sales persons generally earn weekly salaries of
   - a. less than $40.
   - c. $75-$100.
   - b. $50 or more.
   - d. $100 or more.

4. a ☐ b ☐ c ☐ d ☐

4. Life insurance, real estate, and other salesmen who work on commission generally have annual incomes of
   - a. $4000-$5000.
   - c. $8,000-$14,000.
   - b. $5000-$12,000.
   - d. $10,000-$25,000.

5. a ☐ b ☐ c ☐ d ☐

5. The normal work week of a retail sales person is
   - a. 30 hours.
   - c. 44 hours.
   - b. 40 hours.
   - d. 48 hours.

6. a ☐ b ☐ c ☐ d ☐

6. How much education is required of retail salesmen?
   - a. Most employers require salesmen to have 4 years of college.
   - b. Most employers require salesmen to have 2 years of college.
   - c. Most employers prefer to hire high school graduates.
   - d. Most employers do not care about their salesmen's educational background.

7. a ☐ b ☐ c ☐ d ☐

7. Which of the above (Question 6) is true of manufacturers' salesmen?

8. a ☐ b ☐ c ☐ d ☐

8. Which of the following high school courses was not mentioned as one important to future salesmen?
   - a. speech
   - c. math
   - b. business
   - d. science

9. a ☐ b ☐ c ☐ d ☐

9. Mentioned as having a training program in sales was
   - a. University of California.
   - c. San Jose City College.
   - b. San Jose State College.
   - d. Foothill College.

10. a ☐ b ☐ c ☐ d ☐

10. Which of the following is true of sales occupations?
    - a. The majority of people employed in sales work are men.
    - b. There are just about equal numbers of men and women employed in sales work.
    - c. The majority of people employed in sales work are women.
    - d. Retail selling is the only area of sales in which men outnumber women.

11. a ☐ b ☐ c ☐ d ☐

11. The employment opportunities for salesmen today are
    - a. doubtful.
    - c. fair.
    - b. poor.
    - d. good.

12. a ☐ b ☐ c ☐ d ☐

12. The employment opportunities for salesmen in the future is expected to be
    - a. doubtful.
    - c. fair.
    - b. poor.
    - d. good.

13. a ☐ b ☐ c ☐ d ☐

13. What effect is automation expected to have on employment opportunities in sales?
    - a. no effect
    - b. some effect on sales clerks but little effect on other kinds of sales work
    - c. some effect on real estate salesmen but little effect on other kinds of sales work
    - d. some effect on wholesale salesmen but little effect on other kinds of sales work

a b c d
14. ☐☐☐☐ 14. More than half of the people in sales work
- a. are in retail trade.
- b. are in wholesale trade.
- c. are manufacturers' representatives.
- d. are in real estate and life insurance.

a b c d
15. ☐☐☐☐ 15. Which of the following salesmen would generally work longer and less regular hours?
- a. a retail clerk in a large department store
- b. a salesman working for a salary rather than commission
- c. an insurance salesman
- d. a retail clerk in a small clothing store

a b c d
16. ☐☐☐☐ 16. When a salesmanager is promoted he generally
- a. becomes a production manager.
- b. becomes a vice president in the firm.
- c. is given a larger department or area to manage.
- d. has nothing to do with sales.

a b c d
17. ☐☐☐☐ 17. Which of the following was not mentioned as a duty of a retail sales person?
- a. ordering merchandise
- c. writing advertising copy
- b. stocking shelves
- d. taking inventory

a b c d
18. ☐☐☐☐ 18. In a small business the opportunities for advancement
- a. do not exist.
- b. are poorer than in a large busines.
- c. are better than in a large business.
- d. are about the same as in a large business.

a b c d
19. ☐☐☐☐ 19. Which of the following salesmen must be licensed by the state in which they work?
- a. retail salesmen
- c. insurance salesmen
- b. automobile salesmen
- d. wholesale salesmen

a b c d
20. ☐☐☐☐ 20. The work of the wholesale and manufacturer's salesman
- a. requires increasing skills to keep up with technical changes.
- b. requires less training because machines are doing much of the work.
- c. generally does not involve technical change.
- d. will soon be completely taken over by machines.

a b c d
21. ☐☐☐☐ 21. The fastest growing occupations are those
- a. requiring the least skills.
- c. requiring the least training.
- b. requiring the most education.
- d. requiring the most physical strengths.

a b c d
22. ☐☐☐☐ 22. Highly successful salesmen may earn annual incomes up to
- a. $10,000
- c. $20,000
- b. $15,000
- d. $25,000 or more

a b c d
23. ☐☐☐☐ 23. The best time to start planning for a career is
- a. right now.
- b. as a senior in high school.
- c. after graduation from high school.
- d. after working a few years.

a b c d
24. ☐☐☐☐ 24. Which of the following was not mentioned as a person to ask for further information about sales?
- a. a sales person
- c. a business teacher
- b. a counselor
- d. a librarian

a b c d
25. ☐☐☐☐ 25. Which of the following library books was mentioned as one in which you could find additional information about sales?
- a. OCCUPATIONAL OUTLOOK HANDBOOK
- b. CAREER GUIDE
- c. VOCATIONAL PLANNING
- d. OCCUPATIONS IN SALES

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Part II

SUBSIDIARY EXPERIMENTS IN DEVELOPING NEW CAREER KITS

CHAPTER I

SIMULATED WORK EXPERIENCE: AN ATTEMPT TO ENCOURAGE CAREER EXPLORATION

Is there something valuable about actually trying out or "experiencing" an occupation? At present we do not know very much about just what factors influence individuals toward their vocational choices. Past research has suggested several possible answers including birth order (Fisher, 1962; Stone, 1963) and interest (Berdie, 1955; Strong, 1943; Williamson, 1964). Some investigators have pointed to socio-economic influences (Clark, 1962; Circourel & Kitsuse, 1963; Kahl, 1962; Sewell & Arms, 1966). Roe (1956) listed parents, other relatives, friends, teachers and people actually in the vocations in question as the predominant influences appearing in the literature she reviewed.

Work experiences may influence vocational choice. Although Lyon (1959) found no apparent association between summer work experiences and adolescent vocational choice, Deunk (1963) as well as Norton (1953) found a relationship of a positive nature between adult careers and jobs held during high school. Kitson (1925) and Overstreet (1957) point to vocational experiences as influences upon interests in the work world. Unfortunately, it appears that some groups are quite limited in their exposure to such experiences, especially in lower socio-economic groups (Davidson & Anderson, 1952). Even at the upper end of the scale, at least at the junior high school level, such experiences seem to be inadequately provided (Krippner, 1962).

What can a high school counselor do to assist the student in gaining relevant vocational experiences and information? Should he attempt to find the student a part-time job; or perhaps send him to the occupational file to read some pamphlets; or assign a book or two? How might the student be stimulated to search for relevant information?

Granted that it would be impractical and indeed wasteful to provide actual job experience in all the occupations a student might consider. However, it might be useful to simulate work experience by making available a type of "kit" wherein a student could work at tasks like those of an electrician, or a doctor, or whatever occupation he might want to consider. Several such "simulated vocational kits" have been developed at Stanford University (Krumboltz, Sheppard, Jones, Johnson, & Baker, 1967). Each kit presents the student with information on the importance of the occupation and then asks the student to solve some representative problems in that occupation. Sufficient instruction is provided so that most high school students can solve the problems successfully. Preliminary evidence indicates that such kits may be effective with at least some groups in stimulating exploratory occupational information seeking.

The purpose of the present research was to test the effectiveness of a newly developed career simulation kit on appliance serviceman.

Procedure

Sample

All junior English classes of the "C" (predominantly non-college bound) lane at Crestmoor High School in San Bruno, California were selected. Since the Appliance Serviceman Kit was in a predominantly male occupation, only males were included in the study. All females present in these classes were given the same non-problem-solving general career kits received by the male control group. The 55 males were randomly assigned to either the non-problem-solving general career kit (N = 30) or the problem-solving appliance serviceman career kit (N = 25).

Materials

The appliance serviceman simulated vocational kit (Krumboltz & Nelson, 1967) describes in an easily readable style the importance of an appliance serviceman and allows the student to solve representative problems faced by an appliance serviceman in his normal assignments: (1) selecting correct replacement parts from a catalog, (2) detecting possible defects in an appliance, (3) testing electrical circuits in defective appliances; a lighted flashlight bulb indicates an unbroken circuit. Defective appliances are simulated by aluminum foil circuits sandwiched between pages on which appear drawings of the appliance. By placing the probes of the testing device at various points on the page, the student can determine which circuits are defective. The student records his findings on an answer form and awards himself plus marks as he correctly solves the problems throughout the booklet.

The non-problem-solving general career kit (Krumboltz & Sheppard, 1965) is one in which the student is compared to a detective in his search for a vocation. Illustrated and easily readable, the kit describes how the student can assess his abilities, interests, job prospects and trends, and the educational requirements for any occupation. At the conclusion of the booklet is a work sheet on which the student answers questions about what he has learned.

Administration

Only a brief verbal introduction was given at the beginning of each class by the experimenter. Students were informed that they were not being tested but that their assistance was needed in evaluating some materials that had been developed. They were urged to work quietly on their own booklet with no trading of materials during the 50-minute class period. The experimenter remained in the classroom during the period to answer any procedural questions. At a point seven minutes before the end of the period, the students were told to stop work whether or not they had completed the booklet. Instructions were given that if they had not yet finished, they were to make certain that they read all the additional material included in the back of the booklet. At the conclusion of the career booklet and the problem-solving kit were listed three addresses where further information could be obtained. Students were invited to copy as many addresses as they wished in the space provided on the answer form. After a brief time for this activity, all material was collected except for the post cards and the student's copy of the answer form.

Criterion Measures

The purpose of the career kits was to stimulate high school students to search for further career information. All criterion measures were behavioral. Each consisted of an objective record of some information-seeking behaviors. No self-reports or subjective reactions were solicited.

1. Carbon copies of the answer form were collected by the experimenter and the number of students writing down one or more career information addresses was tallied.

2. A stamped post card was also included in each student's booklet. By writing his name and address and mailing the card, the student could request the book, Career Opportunities, giving more information about many possible careers. The number of students mailing the post card within seven days was tallied.

3. A printed announcement at the conclusion of the material informed the students that the counselors at the school would be glad to talk over career plans and possibilities with any interested student. A space was provided for the student's signature if he wished to see a counselor. The number of student signatures was tallied. Subsequently, the names were given to the guidance department.

4. Students were informed that several other similar kits had been prepared on various careers. A specific listing of seven available kits was given. Students were invited to sign for as many kits as they wished to use. The number of students signing up for one or more kits was tallied.

5. For seven days following the administration of the booklets, copies of all available simulated vocational kits were put in the vocational pamphlet rack of the guidance office. The students were notified that they could obtain a pass from their study hall period to use these booklets, or they could make use of them during the lunch hour as well as before and after school. The number of students taking advantage of this opportunity was tallied.

Results and Discussion

The proportion of males tallied for each criterion in each treatment group is reported in Table 1. The statistical test for the significance of difference between two proportions was calculated. The five percent level of significance was selected as the critical region for rejecting the null hypothesis.

No significant differences between treatments were found for any criteria. In fact, for three of the five criteria, the trend was opposite to that predicted. How can such results be explained? Is a problem-solving experience in the context of a specific occupation of no usefulness? A number of post hoc reasons for these results can be generated.

Only 50 minutes were used in the attempt to change a long-standing behavior pattern, and in some cases one that has been aversively conditioned. Unpleasant experiences in libraries hostile to vocational information seekers or experinces with materials that are outdated, dull or difficult may bring about cessation of an already tentative, half-hearted, behavior pattern. Eliciting new patterns of vocational information seeking may require more than 50 minutes and perhaps in addition some pre- and post-procedures in combination with the booklets, such as Ausubel's pre-informational techniques (Ausubel, 1963).

The post card criterion measure might have been more relevant to the general career kit. A book outlining many specific career opportunities might seem more attractive to students who had just learned how to assess their career potentials than to students who had only experienced one occupation.

Forty percent of each group made written commitments that if made available they would like to use booklets similar to the ones they had received dealing with specific occupations. The percent might have been higher if more than the seven specific occupations now available had been listed.

The control treatment, the general career kit, was probably an effective treatment itself. Attractively designed to encourage vocational exploration it had been used in previous research and had proved effective for some groups (Krumboltz, Sheppard, Jones, Johnson & Baker, 1967). Inclusion of a no-treatment control group would have made possible some other useful comparisons.

The two treatments were somewhat contaminated in that each group could watch the other group at work. In future experimentation it might be advantageous to separate treatment groups.

Lack of response by the appliance service group on several of the measures was probably influenced to some extent by a lack of interest on the part of most in appliance service as an occupational choice. However, they did seem to enjoy the method of presentation of material in their problem-solving booklets, and a substantial number expressed interest in similar material on other occupations.

If the students were interested in taking advantage of such material, why did they not respond when the material was actually "made available"? The booklets were placed in the guidance office. The lack of response may have been due to student perceptions of the guidance office functions or to infrequency in student traffic there. Although the office is open for over an hour after school, a large percentage of the students take school transportation home immediately after school and arrive in the morning less than 30 minutes before school starts. Getting released from a class or study hall may involve too much effort in view of the other pressures on students.

Providing simulated occupational experiences may have benefits not measured in this small study. Perhaps for a few students at the proper time an experience in appliance service would be a challenging and stimulating opportunity. For the majority of students who would rather investigate some other occupation at some other time, a specific occupational kit administered at an arbitrary time is ineffective. Future research will be required to determine what kinds of experiences at what point in time are most effective in generating career exploration activities.

Summary

The purpose of the study was to test two alternative ways of stimulating non-college bound youth to begin exploring career opportunities. Fifty-five non-college bound eleventh-grade males were randomly assigned to either (1) a problem-solving simulated occupational experience in appliance service or (2) a non-problem-solving general career kit. Subsequently, participation of the students was tallied on five behavioral criterion measures: (1) the mailing in of a post card requesting a book on careers; (2) the copying of addresses where further information could be obtained; (3) sign-ups to see a school counselor; (4) written expressed desire to use other booklets similar to that received; and (5) actual use of booklets when made available. Statistical analysis of differences in proportions yielded no significant differences at the .05 level. The two approaches were not found to differ from each other in their ability to inspire career exploration.

Table 1

Proportion of Students in Each Treatment Group Engaging in Each Exploratory Behavior

Measure	Problem Solving Appliance Service Booklet N = 25	Non-Problem Solving General Career Booklet N = 30
Post Cards	.120	.200
Counselor Sign-Up	.040	.167
Addresses Copied	.000	.067
Booklet Sign-Up	.400	.400
Booklet Use	.040	.000

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CHAPTER II

AN OPTIMAL GRADE LEVEL FOR CAREER EXPLORATION?

Is there an age or grade level at which students are most responsive to treatments designed to stimulate occupational information seeking? Prior research and theory does not provide a definite answer. Super (1951) in proposing a developmental view of occupational choice states that students early in adolescence achieve a readiness for vocational exploration. MacCurdy (1956) reports that out of 75 Science Talent Search winners, 37 had decided to become scientists in elementary school. Parker (1962) found that in a study of 29,000 seventh-graders in Oklahoma fewer than 10 percent described themselves as lacking vocational goals. Thus, children are thinking about possible vocations in elementary and junior high school. Perhaps appropriate exploratory activities could be inaugurated then.

There are conflicting views about implementing a vocational exploration course in the ninth grade. Super (1960) states that ninth-graders tend to be psychologically ready for vocational exploration, but that the self-knowledge of the ninth-graders leaves much to be desired. Super and Overstreet (1960) state that ninth-graders are clearly in an exploratory stage and not in a decision-making stage. If ninth-graders are in an exploratory stage, they may be very responsive to a vocational exploration course. However, Rubinfeld and Hoppock (1961) report results which are not necessarily in line with the above expectations. In an eight-year follow-up of high school graduates and dropouts who had had a ninth-grade course in occupations, 80 percent of the total group thought the course should be moved to the eleventh or twelfth grade while most of the dropouts felt it should be left in the ninth grade.

Kefauver's (1941) results indicate that the ninth grade may not be the best grade level at which to focus a vocational program. He compared tenth-, eleventh- and twelfth-graders who had been given a ninth-grade course in occupations with similar tenth-, eleventh- and twelfth-graders who had not had the course. Kefauver reports that there were no significant differences between groups in the amount of occupational information they possessed, in the percent who planned to graduate and in the reasons for choosing an occupation. However, since enrollment in the course was voluntary, the consequent self-selection precluded any reliable estimate of the effect of the course itself.

Ginzberg's (1951) "realistic" stage of vocational development occurs at about age 17 at which time the student realizes he must compromise between his wants and the available opportunities. One could hypothesize that age 17 (or eleventh grade) would be the ideal time to present a course or experimental treatment designed to stimulate occupational information seeking.

Twelfth-grade students should be particularly receptive to vocational exploration. Many of them must soon earn their own living. Their decisions cannot be postponed for long. But many may have already made plans and commitments and may no longer be interested in exploring alternatives.

Some rationale or evidence can be found to support or refute almost any grade level as the most important one for presenting a vocational exploration treatment. The purpose of this study was to determine at which of four grade levels a vocational experience would best stimulate occupational exploration.

Method

Subjects

The subjects were all "Track 2" students at Cupertino High School, Cupertino, California, the middle group of a three-track system.

Intact classes were sampled for the study. Both boys and girls were included. The population of classes from which the sample was drawn consisted of all classes in English taught by a single teacher. Since English is required in all four grade levels for these "Track 2" students, problems of unrepresentativeness due to self-selection were minimized. Two classes were selected at random from each grade level.

Materials

Two different booklets were compared in this study. The experimental treatment consisted of a simulated occupational experience (Krumboltz, Sheppard, Jones, Johnson & Baker, 1967). A problem-solving booklet about law enforcement (Police Officer Kit) was designed to simulate occupational information seeking. The booklet was constructed to (1) teach the student some of the basic aims of police work and some of the fundamental facts necessary to solve law enforcement problems, (2) enable the student to participate in solving a short, simple problem like those solved by policemen, and (3) virtually guarantee that the student would be successful in solving the problem.

The Police Officer Kit was also designed to meet the following four specifications: (1) Low reading ability should not interfere with problem solution for 95 percent of the target population; (2) The problem should be intrinsically interesting to the majority of the target population; (3) The problem-solving materials should be capable of being completed within 50 minutes for 75 percent of the target population; (4) A representative of the law enforcement profession should judge the problem-solving booklet as an adequate and representative sample of the tasks in law enforcement. The kit has been pretested on a small group of high school students representative of the target group prior to this study.

The control booklet was a programed text in elementary statistics. It was similar to the experimental booklet in that it was self-administering and contained problems to be solved, but it was not specifically designed to encourage exploration.

Procedure

The two booklets were arranged in a random sequence, and one booklet was administered to each subject. At the beginning of the hour the experimenter told the subjects that all instructions were contained in the booklets but that they could ask questions. The subjects were then given the rest of the period to work on the booklets except for approximately the last seven minutes during which they scored their answer forms and responded to some of the criterion measures.

Criterion Measures

Behavioral measures of information-seeking were used as criterion measures:

1. At the end of the class period the subjects were given a chance to copy and take home as many as three addresses of sources of further information about law enforcement. If any one of the addresses were copied, the subject was given one point.

2. One point was given if the subject signed up to work on any or all of the additional problem-solving booklets.

3. One point was given if a subject signed his name in a box on the criterion sheet indicating an interest in seeing a counselor about vocational matters.

4. The subjects were given post cards with which to request additional occupational information. If a subject entered his name and address and mailed the post card, he was given a point.

5. A subject was given one point if he signed up to look at the school's vocational files during a period which lasted for five school days after the treatment.

6. A subject was given one point if he checked out one or more problem-solving booklets from the librarian's desk during the five-day period.

Results

Few subjects earned two or more points. Most earned none. The resulting skewed distribution of total responses was not amenable to conventional parametric analysis methods. The data as represented in Table 1 were analyzed in terms of subjects responding and not responding to one or more criterion measures.

Was there one grade level in which students engaged in more vocational exploration than any other grade level? To answer this question two separate analyses were done, one for boys and one for girls. A nonparametric analysis, Rijkoort (1952), was used in each case. The percent of subjects responding in control and treatment groups combined was computed for each class within each grade (Table 2). The classes were rank-ordered by these percentages, and the analyses were based on the ranks. The analysis for boys showed a significant difference among the four grades, $S_B = 74$ with $p < .05$. The analysis for girls, however, did not reach the .05 level of significance, $S_G = 62$. However, the general pattern of percentages is similar for boys and girls. Due to the small numbers of subjects responding and the unequal sample size across classes and grades, conclusions are hazardous. However, the eleventh-grade classes contained proportionately more responders, both boys and girls, than did any other grade level.

Why were the percentages for the tenth grade so low? A possible explanation comes from the fact that four weeks prior to the date of this study all tenth-grade students attended a week-long Career Guidance Institute conducted by the county special services department. During this week the students were given vocational interest tests and occupational information. These tenth-graders may have been satiated on occupational information at the time of this study, thus explaining their lack of response.

Was the experimental treatment more effective in stimulating vocational exploration than the control treatment? Again the data were analyzed separately for boys and girls. In each case a 2x2 contingency table was set up in which one dimension was experimental subjects vs. control subjects and the other dimension was responders vs. nonresponders. The test for independence was made by computing a chi square. Neither the chi square for boys ($X^2 = 1.760$) nor the chi square for girls ($X^2 = .092$) was significant. The trend favored the control treatment. One possible explanation is that students may have had an unfavorable attitude toward policemen and/or law enforcement. These students then may not have been stimulated to seek information simply because they did not like the Police Officer Kit. A second possibility is that the Police Officer Kit did stimulate interest and desire for more information, but the criterion measures did not pick it up. This 45- to 50-minute treatment may not be strong enough to bring about actual information-seeking, but it may promote or awaken a new attitude toward occupations in general--an attitude not measured in this study. Finally, it is possible that the control Ss were just curious to see what the experimental treatment was like, and so responded to the criterion measures out of sheer curiosity. Further experimentation is needed in order to determine which of the above explanations, if any, is correct.

Summary

At what grade level will high school students be most likely to engage in career exploration? Within grades nine, ten, eleven and twelve of one high school, two classes were randomly drawn from a pool of "Track 2" English classes. These students spent one class period taking either (1) an experimental booklet designed to provide a simulated experience in solving law enforcement problems (Police Officer Kit) to promote their occupational information-seeking or (2) a control programed booklet in statistics. Criterion measures assessed relevant information-seeking behaviors. Eleventh-grade students tended to seek more information than students in any of the other three grades, but differences between experimental and control groups were not significant.

Table 1

Number of Subjects Responding (R) and Not Responding (NR) to One or More Criterion Measures by Treatment, Sex, Grade and Class

		Boys				Girls			
		Experimental		Control		Experimental		Control	
Grade	Class	R	NR	R	NR	R	NR	R	NR
9th	A	1	7	2	6	2	4	2	3
	B	2	6	4	7	1	3	1	2
10th	C	0	5	1	5	0	2	0	2
	D	0	3	0	4	0	3	1	3
11th	E	1	3	2	3	2	6	4	4
	F	4	4	4	4	4	4	4	4
12th	G	0	6	2	4	2	2	2	3
	H	1	3	1	2	2	6	1	8
Total		9	37	16	35	12	30	15	29

Table 2

Percent of Subjects Responding by Treatment

Sex, Grade, and Class

Grade	9		10		11		12	
Class	A	B	C	D	E	F	G	H
Boys	19	32	9	0	33	50	17	29
Girls	36	28	0	14	38	50	44	18

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CHAPTER III

VOCATIONAL INFORMATION-SEEKING BEHAVIOR AS AFFECTED BY A PROBLEM-SOLVING WORK KIT AND SET ESTABLISHMENT

Decision-making seems to involve curiosity, exploration, and information seeking. What is the best way, operationally defined, to motivate students to explore alternatives, seek information, and make plans in the vocational decision-making process? Much present vocational information is both dull and hard to read (Ruth, 1963). Such information is unlikely to stimulate a student to delve into more dull and hard-to-read literature. The prominent theories of occupational choice (Roe, 1956; Super, 1951) are not concerned with this problem.

One framework which may provide some suggestions for answering questions about vocational exploration is Berlyne's (1960) theory of curiosity, conflict, and arousal. Berlyne states that curiosity is a response to uncertainty and ambiguity. Curiosity is crucial to information-seeking and exploration. The maintenance of exploratory behavior requires that the benefits of exploring the alternatives exceed the risks incurred (i.e., the consequences of the errors or the importance of the problem). The direction of exploration, according to Berlyne, depends upon (1) a sense of the goal of the task, and (2) a knowledge of the relevance of tested alternatives to the achievement of that goal. If we are to promote vocational exploration by students, it is necessary to meet these requirements.

Several variables have been found to increase the amount of exploratory behavior, e.g., novelty, varied or irregular stimulation, and complexity of the stimuli. Berlyne's theory states that "specific exploratory responses . . . are likely to result from an aversive condition or condition of heightened drive due to lack of information (subjective uncertainty). Such a condition . . . is apt to result from exposure to novel, surprising, highly complex, or ambiguous stimulus patterns (Berlyne, 1966, p.30)."

Few empirical studies utilizing human subjects and dealing with information-seeking behavior have been reported. Those studies which have been reported are primarily concerned with hypotheses resulting from Berlyne's theory. Lanzetta and others (Driscoll & Lanzetta, 1964; Hawkins & Lanzetta, 1965; Lanzetta, 1963) have reported on physiological arousal and its relationship to information search. Ss whose general arousal levels were high tended to search more than did Ss with low levels of arousal. However, contrary to predictions based on Berlyne's theory, arousal level did not increase before search for information. The variables of more interest in determining information-seeking were importance of the task (as perceived by Ss) and the uncertainty of the stimuli (Hawkins & Lanzetta, 1965; Sieber & Lanzetta, 1964). It appears from these studies that S's uncertainty due to the presentation of task materials and perceived importance of the correct decision contribute to a high level of information-seeking behavior. If these results may be extrapolated to the task of career exploration, then students who are aware of the importance of making the "best" career decision and are also presented with information promoting uncertainty about possible choices should engage in more information seeking.

There is a relationship between specificity of questions asked the learner and the amount of exploratory behavior that results. In an experiment reported by Berlyne (1966) questions about animals were used. The greatest amount of curiosity was generated by questions about the more familiar animals, by questions the Ss found surprising, and by questions that attributed to species characteristics they seemed unlikely to possess. Another experiment showed that curiosity increased when three, rather than two, alternatives were presented, and when Ss were told that experts were about evenly divided on the correct answer. These kinds of results can be potentially useful in planning a variety of presentations in learning situations.

While it is clear that some ambiguity promotes curiosity, it is also true that information is most easily assimilated when it is presented in a clear, concise, structured fashion. Learning is often enhanced if specific information is given or "sets" established prior to the learning task (Fischer, 1964; Wittrock, 1963). There is some ambiguity as to what the term "set" means, but the usual meaning denotes cognitive processes that predispose the learner to view and approach a problem situation in a given way. This definition implies a readiness to respond.

Wittrock (1963) found that sets produced by written instructions increase the probability that Ss overtly or covertly rehearse certain pre-experimentally determined associations, and occurrences of these responses facilitate learning of related materials. Fischer (1964) reported that students in whom specific rather than non-specific sets were induced performed better on tests of reading information. It was also found that using "advance organizers" facilitated performance on meaningful verbal learning tasks (Ausubel, 1960, 1963; Ausubel & Fitzgerald, 1961). Advance organizers are essentially sorting and classifying models. The label "advance" describes the necessary operation of providing these models as a learning task which precedes the learning of paramount interest. Ausubel's organizers were concepts and generalizations into which ideas to be learned could be easily assimilated.

It was assumed that advance organizers or sets having to do with vocational information-seeking coupled with the novel presentation of occupational information would tend to foster exploratory behavior by students. One of the bases for using a set was to establish the importance of the task, which has been shown to be a determinant of information search (Hawkins & Lanzetta, 1964; Sieber & Lanzetta, 1964). In addition, content concerned with career decisions could be easily incorporated into the students' structure of knowledge.

In an attempt to produce vocational materials that would promote curiosity and interest, Krumboltz, Sheppard, Jones, Johnson, & Baker (1967) developed several simulated problem-solving work kits. These kits were designed to give S̲s a chance to solve problems much like those found on the job in various occupations. The reading level of these kits was set so that the majority of non-college-bound high school students could read and solve the problems successfully in fifty minutes or less. An additional work kit concerned with the job of an electronic technician was developed for this study.

The primary purpose of the present study was to compare the curiosity arousing value and the consequent amount of information seeking generated by both a sample work kit and control material with and without pre-organized vocational information designed to establish an exploratory set.

Method

Subjects

Eighty-five sophomore students from a suburban high school in the vicinity of Stanford University served as Ss. All of these students were classified by the administration as being "general" or non-college bound students. The sample consisted of 35 females and 51 males.

At this school all sophomores are required to take "laned" English classes. There were nine "general" lane English classes available in the sophomore class. The present sample was made up of four of these classes. Another experiment utilizing similar materials required the use of the remaining five classes.

Materials

Work Kit

A simulated work kit dealing with the occupation of an electronic technician was developed for this study. The kit included a programed set of basic concepts necessary for work in electronics. Problems dealing with these concepts were to be solved by S. Immediate written feedback was given after completion of each of the problems. Some of the problems involved circuit testing. For these problems actual resistors were inserted into simple schematic drawings. To test the circuits S had a small meter box containing an ammeter, batteries, a resistor, and test leads. These circuit testing problems were designed to approximate very simple problems an electronic technician might encounter.

Carboned answer sheets were included in each set so that S could retain one copy and one copy could be returned to E. In addition to answer spaces the answer sheet had space for the student to write down any questions he might have about the job, space to copy down addresses to which he could write for more information about the job, and questions to which he was asked to respond "yes" or "no": (1) Were you successful with the problems? (2) Would you like to find out more about this job?

Organized Information

The second treatment instrument was a short, one and one-half page information sheet concerned with what a student could do to explore the occupation of an electronic technician. It was designed to establish an information-seeking set. It contained sample questions to be asked and also specific directions about how to find the answers to such questions. The organized information sheet also provided some fairly abstract reasons why it is a good idea to start investigating various career possibilities while still in high school. This last part was included in hopes of giving Ss a set about the importance of the task to be performed.

Statistics Booklet

A programed statistics booklet on percentiles was used as irrelevant control material. Similar carboned answer sheets were given to Ss who worked with this instrument.

Treatments

Students were told the day before the treatments that some people from Stanford University would be in the next day to distribute some materials. The Es arrived, gave a very short talk to Ss, telling them the materials were not a test and that they should work alone.

All Ss were randomly assigned to one of four treatments: (1) a combination of the work kit and organized information; (2) the work kit alone; (3) organized information coupled with the statistics booklet; (4) the statistics booklet alone. All procedural instructions were in the booklets.

At least one E was present during the treatment period of one 50-minute class period. Seven minutes before the class ended Ss were asked to stop, total their answers, pass in one copy of their answer sheet, turn in treatment materials, and respond to certain criterion instruments.

Criteria

The last page of the work kits listed addresses of three places to which Ss could write for further occupational information. These same addresses were inserted into the statistics booklets for use by Ss exposed to that instrument.

After treatment materials were collected Ss were given a mimeographed paper with a post card attached. The post card could be sent to Es at Stanford University, and a paperback book on general occupational information would be sent to S. The paper to which the post card was attached had spaces where S could indicate whether he or she would be interested in: (1) seeing a high school counselor for some vocational information, and (2) using a work kit for a different occupation. The other occupational kits were entitled Sales, Medical Laboratory Technician, Police Officer, Accountant, Appliance Repair, and X-Ray Technician. It was made clear by Es that these kits would be available for use in the school counselor's office for one week only.

The work kits, including the Electronic Technician Kit, were placed in the counselor's office at the end of the school day on which treatments took place. The counselor's office also contained a wealth of career materials for student use, e.g., short brochures about specific jobs, the Occupational Outlook Handbook, and college catalogues. For one week the counselor's secrtary kept a list of the students using any of the available occupational materials.

In summary, the criterion measures were all behavioral responses: (1) requesting a general book on occupations via a post card; (2) indicating a desire to use another work kit; (3) actually using another work kit; (4) copying down addresses listed in treatment booklets; (5) indicating a desire to see a counselor to discuss careers.

A period of one week after treatment was set as the time period during which criterion responses would be tallied. Responses made after one week were not included in the analyses. A list of all Ss who indicated they would like to see a counselor was sent to the counselors and these students were seen after the data gathering period was terminated.

Results

The total response rate on any of the criterion measures was quite low. While as much as 34 percent of the total sample made one or more responses, only 12 percent of the potentially possible responses were made. Although a number of Ss indicated they would be desirous of using similar work kits, no student actually used any of the available kits.

The number of students who responded to one or more of the criteria are tablulated in Table 1. Three chi-squares were computed to determine whether there were post-treatment differences between each of the first three experimental treatments and the fourth control treatment. These data are reported in Table 2. Two of the obtained chi-squares were statistically significant beyond the .05 level.

The simulated work kit, both alone and in combination with the organized information, resulted in significantly more career exploratory activities than did the control statistics booklet alone. The differences in response rates to criterion measures were not great between the three experimental treatments. The relatively low response rate, the somewhat insensitive chi-square statistic, and the small N make inferences about experimental treatment differences inconclusive. Only tentative conclusions about the comparative effectiveness of these treatments are possible.

Some non-statistical data are available concerning the reaction of Ss to the simulated work kit. All Ss who were exposed to the work kit had the opportunity to indicate whether or not they enjoyed using it. Of these 43 Ss, 32 marked that they did enjoy working with this material, and 20 Ss suggested they would like to find out more about the job. Data are, at best, suggestive, but they indicate that such work kits are appealing and interesting to high school students and worth further investigation.

Discussion

Any attempts to promote career exploration on the part of high school students are fraught with difficulties. Most high school personnel are aware of numerous competing responses that interfere with not only career exploration but with academic endeavors. The difficulty lies in altering the response hierarchy common to many high school students.

One attempt to bring vocational exploratory responses above threshhold is to present inherently interesting and exciting materials designed to promote career exploration. The problem-solving kit discussed in this study was such a stimulus. One difficulty in assessing the effectiveness of this instrument, and others like it, is in developing adequate criterion maasures. Certainly students were willing to respond favorably to the kit when asked to answer a question regarding its enjoyability. Behavioral measures received far fewer responses, however. Perhaps the measures were insufficient, perhaps more time was required to collect responses, or perhaps the time of year was not conducive to career exploration.

Only 10 students in the group which received both the work kit and pre-organized materials made any criterion responses (about one-half of Ss in that group); eight students in the group receiving a statistics booklet along with the pre-organized sheet made one or more criterion responses (about 40 percent of Ss in that group). This suggests that either the criterion measures were not tapping the appropriate behaviors to reveal change in response to career exploration, or that such information as that contained in the set establishing sheet does almost as good a job in getting students to make exploratory responses as does a more sophisticated instrument such as the Electronic Technician Kit.

In all, the results of this study indicate that the electronic technician simulated work kit is more effective in eliciting vocational information seeking responses than is irrelevant material. However, it did not prove to be practically more effective than did a simple information sheet listing reasons why one should be thinking about career planning, a list of sample questions one could ask to find information, and specific directions about where to go to find answers to such questions. Although the work kit together with the set establisher seemed to promote more information seeking than either by itself, the difference was not great.

The most effective way to help students begin career exploration is not known. It seems that one promising approach is use of novel and fairly complex problem-solving simulated work kits. Such kits might be made more effective by establishing the proper set prior to exposure.

Summary

Will a problem-solving simulated work kit, a vocational advance organizer or the combination of the two generate more vocational information-seeking than irrelevant control material? The Ss were 85 sophomore students drawn from "general" English classes. The criterion measures were behavioral responses such as signing up to see a counselor or use another work kit, sending a post card for vocational information and copying addresses for further information.

Less than 34 percent of subjects made any responses to the criterion measures. Three chi-square analyses were computed to determine the post-treatment differences between the four conditions. Two statistically significant chi-squares were obtained ($p < .05$) indicating that exposure to the work kit with pre-organized information and work kit alone generated more information-seeking responses than did irrelevant control material alone. A majority of Ss exposed to the work kit indicated they enjoyed working with the material.

Table 1

Number of Ss in Each Treatment Condition Making One or More Criterion Responses

Treatment Group	Ss Responding
Work Kit plus Set Establisher	10
Work Kit Alone	9
Irrelevant Material plus Set Establisher	8
Irrelevant Material Alone	2

Table 2

Obtained Chi-Squares Contrasting Irrelevant Material Treatment with All Other Treatments

Treatment Group	Chi Square
Work Kit plus Set Establisher vs. Irrelevant Material Alone	5.71*
Work Kit Alone vs. Irrelevant Material	4.01*
Irrelevant Material plus Set Establisher vs. Irrelevant Material	3.21

* $p < .05$

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CHAPTER IV

SIMULATED WORK EXPERIENCE: HOW REALISTIC SHOULD IT BE?

One of the major goals of counseling is to help students learn how to make wise decisions (Gelatt, 1962; Katz, 1963; Krumboltz, 1966). The decision-making process includes considering a number of alternative courses of action, searching for relevant information about the possible outcomes of each alternative, and evaluating the information obtained in light of personal value judgments in order to arrive at a tentative decision.

One of the most critical decisions for a student is the choice of an occupation. All too often, however, students reach a vocational decision on the basis of wholly inaccurate information obtained from unreliable sources.

How can counselors help young people to explore the many relevant opportunities open to them? One basic assumption is that the collection of information relevant to a decision is essential to good decision-making. Hence, high school students should learn to make more appropriate decisions if they become active participants in information-seeking about their own vocational and educational plans (Clark, Gelatt, & Levine, 1965; Krumboltz, 1965; Krumboltz & Schroeder, 1965; Krumboltz & Thoresen, 1964; Thoresen & Mehrens, 1967).

The general purpose of the present study was to test experimentally the effectiveness of simulated vocational problem-solving experiences in generating interest in career exploration on the part of high school students. Problem-solving kits were prepared. The kits were intended to teach the student the essential facts necessary to solve one type of problem in a particular occupation. The kits provided the student an opportunity to solve a simple problem representative of those solved by members of that occupation. The problem was designed so that almost every student would be successful in solving it.

The specific objective of the experiment was to contrast the effects of two variations in the problem-solving kits. Research evidence already suggests that kits which involve students in solving problems are effective in stimulating vocational exploratory responses (Baker, 1967; Johnson, 1967; Jones, 1966; Sheppard, 1967). How much additional career interest might be generated, however, if students could solve an occupational problem by manipulating an actual tool representative of those used in that particular field?

This study was designed to test the differential effectiveness of two problem-solving kits dealing with the same occupation--electronic technician. The two kits were the same in every respect except that with one kit students used an actual ammeter to solve a problem; with the other they had only a picture of a meter to solve the same problem.

Berlyne's work (1960, 1965, 1966) postulates the existence of an exploratory drive aroused when an individual encounters perceptual or conceptual conflict. The drive diminishes when subsequent exploratory responses produce additional information about an aspect of his environment. Although the source of exploratory drive arousal lies in conflict, it is only when the arousal exceeds a point of balance that an individual will perform exploratory behaviors in order to bring about conflict resolution. Once he begins to make exploratory responses, an individual is able to obtain environmental information not previously available to him. The information subsequently is useful for making decisions which will resolve persisting conflicts. In the present study, the condition of intensified exploratory drive resulting from lack of information was set up by providing students with a unique problem-solving situation.

It was hypothesized that students assigned to the Electronic Technician Kit involving the use of an actual ammeter would make more vocational exploratory responses than an equivalent group of students assigned to the control kit which merely simulates using a meter.

Method

Subjects

The experiment was replicated in each of four tenth-grade, non-college bound English classes in a suburban high school near Stanford University. The community this school services is composed largely of middle class families. From a sample pool of 100 students, stratified by sex, random assignment was made to one of two treatment conditions.

Treatments

Experimental: Electronic Technician Kit with Meter

The Electronic Technician Kit with meter consisted of three parts:

1) Basic facts about electrical circuits emphasizing Ohm's Law and the concepts of voltage, current and resistance;
2) Simple problems requiring the use of a 500 milliamp meter to test for correct amounts of voltage, current and resistance in a variety of circuits;

3) A culminating, five-step, trouble-shooting problem also requiring the use of the meter.

Students learned how to use the meter for solving electronic problems by attaching the meter leads to actual resistors placed in schematic drawings of circuits. The trouble-shooting problem involved locating the defective part of a circuit with two resistors in series.

Twenty questions were interspersed throughout the kit to which the students responded on an answer form. The answer to each question appeared in the kit on the page following the question enabling the student to receive immediate corrective feedback. At the end of the kit, the student was informed that ten or more correct answers out of twenty should be viewed as a successful experience with the kit.

Control: Electronic Technician Kit Without Meter

The control treatment was virtually identical to the experimental treatment except that the kit included no meter and the instructions had to be modified accordingly. A simple drawing of an ammeter was substituted, but subjects could not test their theoretically derived values with actual ammeter readings. Since an ammeter increases the cost and administrative complexity of the kit, the control treatment enabled a test of its necessity. The more basic question concerns how realistic career kits must be to promote student interest and exploration.

Procedure

The treatments were administered on April 17, 1967. At the beginning of each 50-minute class, the regular teacher introduced the two experimenters. One experimenter then announced that for the remainder of the period students would be working with materials dealing with occupations. It was suggested that this experience would be helpful to each student as well as useful for a study currently taking place at Stanford University.

In order to reduce interaction between experimental and control subjects, the experimenters randomly assigned each treatment group to one of two available classrooms for the administration of the treatments. The experimenters announced that half the class would go to another classroom in order that each student might have sufficient room to work with his materials. Experimental and control treatment kits then were randomly assigned. Since the meters had not yet been distributed to the experimental subjects, the two booklets appeared identical. After the groups were separated, the meters were distributed to the experimental subjects. Experimenters were assigned randomly to the two treatment groups in all four classes.

While the students were working with the kits, the experimenters answered only administrative questions. To other questions they typically responded, "Do your best to figure it out by yourself." It was assumed by virtue of the design of the kits that each student could solve the problems in his kit without additional help.

With seven minutes remaining in the class period, the experimenter stopped those students who had not already finished, asked them to advance to the final summary pages, score their answer forms, answer several questions, and read the information on the criterion sheet inserted at the end of the kit. Both the answer form and the criterion sheet were duplicate forms: students kept the original copy of each form while the duplicates were collected by the experimenters.

Criteria

Some criterion measures were collected immediately at the end of the treatments. Others represented behaviors which could occur anytime within one week after the treatments.

(1) Immediate career exploratory responses recorded either on the answer form or the criterion sheet:

(a) Self-reported Enjoyment. "Yes" or "no" response to the question: "Did you enjoy working with this kit?"

(b) Intent to Explore. "Yes" or "no" response to the question: "Would you like to find out more about this job?"

(c) Inquiry Expression. There was space on the answer form for questions students would like to have answered about the work of an electronic technician and similar occupations. The number of students who asked at least one question was recorded.

(d) Recorded Addresses. The final page of each kit listed three addresses to which students could write for more information about the job of an electronic technician as well as other occupations. Space was available on the answer form to copy down the addresses. The number of students who wrote down one or more of these addresses was recorded.

(e) Counselor Sign-Up. On the criterion sheet, there was a space for students to sign their names if they wanted to talk with their counselor about career planning. They were told that this information would be given to their counselor.

the number of students who signed their names was recorded.

(f) Career Kit Sign-Up. The criterion sheet informed students that additional kits dealing with other occupations were available. The kit titles (Sales Development Kit; Police Officer Kit; X-Ray Laboratory Technician Kit; Medical Laboratory Technologist Kit; Electronic Technician Kit; Appliance Serviceman Kit; Accountant Kit) were listed with space opposite each for students to sign their name if they were interested in working with it. The following information was recorded:

(1) number of students signing their name after the Electronic Technician Kit;

(2) number of students signing their name after at least one kit;

(3) number of students signing their name after two or more kits.

(2) Delayed vocational exploratory responses: one-week cut-off.

(a) Career Kit Use. The criterion sheet informed students that several copies of each kit listed in 1(f) above would be placed in the school counseling office for their use. A record was made of the number of students who actually came to the counseling office and made arrangements to work with at least one of the kits during the first week after the treatments.

(b) Post Cards Mailed. Attached to the criterion sheet was a post card which each student could mail for further information on careers. The number of post cards received at Stanford University was recorded.

Results

Chi-square tests were computed for each criterion measure to determine whether the experimental and control groups had the same proportions of responses. These tests are summarized in Table 1.

All treatment differences except one favored the career kit which involved use of a meter. Five of the ten differences were statistically significant at the .05 level or beyond. Students given access to an ammeter with their kit reported more enjoyment, wanted more information about an electronic technician career, wrote more questions about careers, and signed up for more career kits than did students not given a meter with their kit. The responses to the two delayed criterion measures were too few to calculate a test of significance.

Why did both experimental and control treatments stimulate so much student interest in working with more problem-solving kits at a later time and yet so few instances of students actually going to the counseling office to work with them? The following considerations offer a tentative explanation.

First, the fact that counselors frequently perform the administrative function of dealing with minor student rule infractions may have made them unlikely sources for the students to approach voluntarily. Another criterion measure which failed to produce clearly significant differences, 1(e),was also linked with counselors.

Second, voluntarily seeking out materials in the counseling office may have conflicted with students' typical responses to a more directive instructional pattern in the classroom.

Third, the time and effort involved in responding to additional kits might well have been lacking in view of the other pressures and pleasures during the Spring semester.

Fourth, the rather short duration of the treatment (less than 50 minutes) made it improbable that large numbers of students would respond through extra-classroom activities.

Another problem was the lack of variety in delayed data collection methods. At least one relevant procedure was not attempted. Although students were given an opportunity to copy as many as three addresses of agencies where further information about careers could be obtained, no attempt was made to record how many students actually contacted them.

This experiment suggests that more life-like occupational problem-solving materials involving the use of realistic tools may increase student interest in career exploration. It may be helpful to combine interest arousing materials with individual and/or group counseling methods already demonstrated to be effective in stimulating information-seeking behavior (Krumboltz & Thoresen, 1964; Thoresen & Krumboltz, 1967.)

Summary

One hundred tenth-grade non-college bound students were randomly assigned to receive two alternative types of materials: (a) experimental: an Electronic Technician Kit which required students to use an actual ammeter in solving problems representative of that occupation; (b) control: a kit virtually identical with the experimental treatment except that no meter was provided. The experimental subjects reported more enjoyment, wanted more information about an electronic technician career, wrote more questions about careers and signed up to take more additional career kits than did the control subjects. However, the number of measured exploratory activities during the first week after the treatments was too small for testing.

Table 1

Chi-Square Analyses of Immediate and Delayed Criterion Responses

Measure	Number of Positive Responses Meter	 No Meter	Chi-Square
1a. Self-Reported Enjoyment	37	25	5.13**
1b. Intent to Explore	36	14	17.64***
1c. Inquiry Expression	11	3	4.06*
1d. Recorded Addresses	16	7	3.61
1e. Counselor Sign-Up	9	4	1.41
1f. Career Kit Sign-Up			
(1) Electronic Technician Kit	9	2	3.68
(2) Any One Kit	20	8	6.00**
(3) Two or More Kits	14	4	5.42**
2a. Career Kit Use	0	1	-----
2b. Post Cards Mailed	2	0	-----

* significant at the .05 level
** significant at the .025 level
*** significant at the .01 level

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Part III

ORIENTING STIMULI IN VOCATIONAL PROBLEM-SOLVING AS FACTORS IN PROMOTING CAREER INFORMATION-SEEKING

CHAPTER I

PROBLEM STATEMENT, RATIONALE AND REVIEW OF LITERATURE

Introduction

A small boy answers the question, "What do you want to be when you grow up?" by readily and eagerly responding that he will be a cowboy or an astronaut. Rarely would an adult inquirer bother to question what the child knows about the details of these romantic occupations; the child's grasp of them undoubtedly came from news and entertainment sources, not from experience. The same boy as a twelfth-grade student is most likely able to answer that same question. In fact, he will most likely have already made decisions on the basis of having some career goal, although his knowledge of occupations and the foundations for his planning are probably not much more formulated by experience than his eager responses were as a little boy. "Most young people make this critical /career/ decision on the basis of whims, inaccurate stereotype, or the suggestions or example of some key person in their lives" (Krumboltz and Schroeder, 1965, p. 19).

The contention that youth make career and occupational decisions on limited information or scant recognition of the occupational possibilities and alternatives open to them is held by many concerned writers. Super and Overstreet (1960), in describing a study of ninth-grade students noted that knowledge of duties, condition of work and other important characteristics of occupations the students preferred were seriously limited. Slocum (1965) stated that "it seems highly improbable that many occupational choice decisions by adolescents are based on a systematic and objective evaluation of all relevant factors. . ." (p.861).

In reviewing evidence collected on the range of occupations in which adolescents express interest, Hoppock (1957) concluded that their scope of interests was greatly curtailed.

As early as 1942, Kitson stated:

> The truth is that interest in a vocation can come only through experience conducive to the development of interests in specific vocations (p. 567).

More recently Krumboltz expressed a comparable view:

> The problem stems from the fact that there are very few opportunities available to young people in which they can actually solve the types of problems faced by many people in each of many occupations. Young people may observe employed persons at their work, but even then they see only the outward manifestations of the job, not the problem-solving process itself. An adolescent may have virtually no idea of the problems and responsibilities faced on the job by his own father. Even though he may see his father at work on some occasions, he sees only the superficial aspects of the job. He may see his father signing his name, punching a calculator, talking to a secretary, pushing buttons, or adjusting machinery. But the youth has no conception as to what is being accomplished, how this job fits into the total process, what problems must be solved, and most of all he has no idea whether or not he himself could do the job (1965, p. 3).

Realistic work experiences for most future career possibilities are often unavailable to young people or overlooked when they are possible. In order to resolve the problem of providing adolescents an experiential basis for vocational planning and academic planning that would eventually lead to desired career goals a variety of suggestions have been made for the school or vocational counselor. According to Samler (1964):

> One of the key problems confronting the counselor has to do with making the work world real. For many youths the situation is such that they are not confronted with the reality of work. They are separated from it physically and even vicariously (p. 412).

Yet he further suggests that, "The counselor also may lack appreciation and feeling for the actual work situation" (p. 412). In effect, Samler's statement in 1964 varies little from Kitson's in 1942:

> One duty of the vocational counselor is to help the individual to become interested in occupations... (p.567)

The principal difference in the statements is that Samler indicated that counselors themselves possibly, or probably, do not totally grasp the details of specific occupations and jobs in the sense expressed by Krumboltz. If it is for counselors to make work experience a reality for students or to help them to "become interested" in occupations, then the question must be: How are counselors to solve these problems? What method have they to enable them to help make work real for students or to become interested in various occupations?

The counselor's armamentarium for affecting desired changes is largely reflected in the professional literature of his field. An inspection of the literature of vocational counseling reveals an extensive volume of research and expository writing.

Perhaps the most salient examples of recent research on career-choice patterns are the large-scale longitudinal and cross-sectional studies of the diverse human characteristics related to educational, vocational and personal development. Holland (1964) reviewed a number of research programs including longitudinal investigations such as Tiedeman's studies of career development (e.g., Tiedeman and O'Hara, 1963). He also reviewed those using more of a cross-sectional research orientation including the Project TALENT study of American high school students (e.g., Flanagan et al., 1962, 1964), Roe's attempts to correlate personality characteristics with occupational choice (e.g., Roe, 1956, 1964), and Holland's own research on vocational behavior conducted through support of the National Merit Scholarship Corporation.

Generally, it has been accepted that the primary functions of these comprehensive research programs are that they contribute to the development and extension of theories of vocational development and that they augment the accumulation of extensive bodies of correlational data. Hoppock (1957) has listed eighteen theories of vocational choice and development. All of these major programs of research are correlational studies designed to relate vocational behavior to other data collected at the same or an earlier time. None of them involve experimental controls. In his critical evaluation of these programs Holland stated that "the goals of all major research programs are unnecessarily ambiguous and they even tend to vacillate from time to time" (p. 277), and that "most of the empirical research has been done with atypical samples (eminent scientists, National Merit finalists, and Harvard students), or with samples so small that actual predictive studies of choice or career pattern are not feasible (e.g., Super's career pattern study)" (1964, p. 278).

Although these few paragraphs can scarcely review the spate of material on occupational interests to date, they do represent the tenor of thinking and concommitant research in the field. The consequence of such research in developing vocational counseling methods is described by Hoppock (1957). He discussed some of the tools which are available to vocational counselors to aid in directing and developing interests of their counselees. Such activities as vocational courses, practical learning of vocational skills, visiting factories and other places of business, and bringing into the school setting people in various occupations are all thought to be helpful in developing interests:

> Unfortunately, these activities have not been evaluated for their effect upon occupational interest. Most of the students who were questioned about the value of a vocational course reported that it was valuable but such testimonial evidence cannot be given much weight (Krumboltz, 1965, p. 9).

Krumboltz' statements about Hoppock's discussion of vocational counseling methods is a commentary on the entire array of correlational research programs and their allied theoretical developments. In Wrenn's terms:

> What troubles me is not the number or variety of theories intended to throw light upon the psychological nature of vocational choice, rather it is the lack of research sophistication implied. The value of a theory lies not only in its psychological or other rationale... but in its capacity to generate research (1959, p. 94).

Holland (1964) also commented on the limited utility of these correlational studies which try to make the causal inference that vocational behaviors are a function of personality, developmental and social background determinants.

> . . .the magnitudes of the obtained relationships are often of little practical value. . . From both a practical and a theoretical standpoint, the status of the field is uncertain, although current efforts promise much (p. 277). Theory is interesting, but it is only an academic exercise unless we can show that it is or it is not useful in research and practice. Burgeoning research promises to alleviate some of our empirical problems (p. 284).

Beilin (1963) called for a shift from naturalistic observation to laboratory and controlled field experimentation. Brayfield and Crites (1964) expressed their support for much greater use of the experimental method:

> Vocational guidance research has leaned heavily upon non-experimental methods. The determination of group difference and correlational analysis are the most frequently used methods, incorporated in designs which limit the inferences that can be made regarding causal or, more properly, functional relationships. There is a dearth of experimental field studies of occupational behavior. . . There has been so little laboratory experimentation on vocational problems that we appear to appreciate neither its possibilities nor its limitations (p. 315).

Experimental efforts to understand better the variables that influence occupational interests and choices have been sparse and slow to develop. Often experiments from other fields of psychology or communications have been applied or referred to in vocational education and guidance. For example, one of the few experimental attempts to generate interest was reported by May and Lumsdaine (1958). They found that showing the movie of a novel did not necessarily cause students to take that book out of the library, but showing just a few interesting episodes did increase the number of students withdrawing the book. Perhaps, by presenting to students interesting problems in an occupation and allowing them to try solving these problems, students would be motivated to engage in a more extensive exploration of new opportunities.

More recently a series of studies have been performed to examine methods of stimulating students to explore educational and vocational information and opportunities. One line of research has been directed to the use of "model-reinforcement counseling" and "reinforcement counseling." Doctoral dissertations by Schroeder (1964), Thoresen (1964), Varenhorst (1964) and Hosford (1966) have applied these methods to stimulate information seeking among students as a necessary initial stage in career and educational decision-making. A second line of experimental research has centered about vocational problem-solving.

These latter studies were developed in projects by Krumboltz (1967a, 1967b) and described in dissertations by Sheppard (1967) and Jones (1966), who, by presenting students with simulated occupational problems, attempted to examine treatment influences upon occupational information seeking.

The collective purpose of all these related investigations has been to study from a controlled, experimental orientation the relative effectiveness of a variety of techniques and procedures developed to assist individuals in their educational and vocational decision-making to understand better what variables influence the development of their career-choices. These studies contrast sharply with earlier correlational and descriptive research efforts. The more recent works represent an effort to meet the requests for increased experimentation in the area of vocational guidance. It is on these latest experiments that this present study is based.

Statement of the Problem

The purpose of this study is to examine the effectiveness of particular variables for stimulating occupational information-seeking following the presentation of vocational problem-solving materials. Earlier studies have sought to determine the effectiveness of problem-solving relative to customary forms of descriptive occupational materials for stimulating information seeking. Another has attempted to determine the optimal difficulty level of the occupational problems for students with varying initial interests and ability levels. These research efforts have concerned the problem-solving materials themselves: their development and their refinement according to individual differences.

The present study is concerned with the manner in which the materials are presented to the students and means of directing the students' attention to informational sources.

Three variables will be examined in relation to their influence on information seeking subsequent to the application of problem-solving kits. One independent variable will be "choice" -- honoring or not honoring the student's preference for certain occupational kits. In what way does giving a student his choice of occupational materials influence his later information acquisition? Arguments may be posed both for and against giving students their preferences for occupational data or materials: (1) students who receive the materials they choose will value them more and, consequently will expend more effort to obtain further information; or (2) students who are not given their preferred materials will have their knowledge of jobs expanded and therefore will be stimulated to investigate more information. A unique feature of this study is that in it "choice" and"non-choice" will be experimentally manipulated. That is, all subjects will choose the occupations with which they wish to work; some will receive their preferences while others will not.

A second independent variable will be the quality of guidelines for comparing two or more occupations. In what way does the quality of the information collected by the student change according to the types of questions posed to him as guidelines for his information seeking? Two types of questions will be used: (1) specific questions, and (2) more general questions.

A third independent variable concerns the notice given a student prior to his informational explorations that he will be expected at a fixed time in the future to utilize the data collected. What will be the relative effect of notifying or not notifying students that questions will be posed for them after they have had an opportunity to collect information about occupations that interest them?

These three variables, hereafter referred to as choice, question specificity, and inquiry notification, will be applied to determine in what specific ways counselors and teachers may promote information seeking in occupational guidance or instructional settings. Although the occupational materials are unique the independent variables are not peculiarly involved with the materials per se. Consequently, the results of the experiment may have applicability to a range of occupational education settings.

Review of Related Literature

The previously cited series of experimental studies conducted at Stanford University have all focused upon stimulating, by several means, a student's information gathering in order for him to be able to generate decision alternatives. Following the work of Gelatt (1962) these studies have been performed from the point of view that the student or client will be able to make the best decisions about educational and occupational matters when he has developed an array of suitable choice alternatives. In order to generate alternative courses of action he must have information about situations to which he aspires. This framework -- that of providing a sound basis for client and student decision-making by the acquisition of relevant information -- provides the present investigation with direction and rationale.

Two distinct approaches have been taken to stimulate student occupational information seeking: (1) simulating occupational tasks thereby allowing students to solve the problems a worker at a particular job solves, and (2) modeling for the student various avenues to acquiring information that he may need: the models having been peer social models. The relevance for these concepts to this experiment are explained in the following discussions.

Occupational Simulation

Simulation has been long employed for business, industry and military training purposes. Simulation permits a trainee or learner to experiment with variables in the training situation without suffering negative consequences resulting from unforseen events. In Dawson's terms:

> One of the advantages of simulation is that it permits the experimenter to study processes in ways that nature prohibits. The simulation can be run many times with the values of the parameters being modified between runs and changes in output observed. The experimenter exercises a great deal of control (1962, p. 12)

Relevant to occupational task simulation, little literature is available. In a work experience project by O'Rourke (in Kitson, 1942) occupational problems were presented boys varying from elementary to high school ages. The tasks for each occupational field were given in series beginning with simple problems and progressing to more difficult levels. Evaluation of the total project was informal and results depended upon self-reports from the students. Before the students were given the project kits they were asked to indicate on a list which of the kits they would enjoy working with. Each student was given three projects not all of which he had elected. Following the termination of O'Rourke's project another preference list was administered to the boys. Comparison, not statistical, of the pre- and post-tests reportedly showed contrasts in some fields, suggesting that the students had developed new interests "by exerting activity" (p. 509).

Sheppard (1967) reported a pilot study in vocational problem-solving conducted in 1965. In his study problem-solving kits in accounting were compared with accountant information materials and general career information booklets. Five hundred forty, eleventh-grade subjects were randomly assigned to receive one of the three types of materials.

Subjects in the problem-solving and accounting information groups reported a greater interest in the field of accounting than did the general information control group. The problem-solving treatment stimulated more career relevant information-seeking than the other two procedures for only half of the subgroups identified. This significant interaction needs to be replicated to confirm the type of subjects most affected by the problem-solving procedure. Interest in accounting, as measured by items from the accounting key of the Kuder Form D, was not differentially affected by the treatments.

Among subjects from the three groups who requested counseling interviews following the treatments, accounting was the occupation most frequently inquired about even though no one from the general information control group did so. Subjects from the problem-solving group asked the type of questions rated as most specific. This study by Sheppared appears to be the first experimental research attempting to create an occupational interest.

A study by Jones (1966) used film-mediated presentations of problem-solving situations in banking to motivate interest in vocational exploration. A total of 270 tenth-grade high school students were randomly assigned to experimental and control treatments. Experimental groups watched a film on banking in which problem situations were presented for subjects to solve. Some control groups watched similar films but without the problem-solving opportunities. Other controls used printed materials rather than films.

The experimental films as a group were more effective than the groups of control materials in influencing subjects' expressed and inventoried interests in banking occupations but not their subsequent vocational exploratory activities. Neither group of materials was significantly superior on the latter dependent variable. Subjects who viewed the two active-participation films scored higher on the dependent variables of expressed and inventoried interests than did those viewing the passive experimental films.

An investigation by Krumboltz (1967a) experimentally tested occupational problem-solving materials simulating problems in sales, medical laboratory technology and X-Ray technology with 561 tenth-grade high school students from two high schools, one located in a neighborhood of middle to upper-middle class families and the other in a less economically privileged area. Subjects were randomly assigned to experimental and control treatments. Experimental treatment booklets presented subjects with problems typically solved each day by workers in the particular occupation, gave subjects the information necessary to solve the problems, virtually guaranteed the students would be successful in solving this first problem in that occupation, and indicated to them whether or not their solutions were correct. Control groups were given booklets which presented similar information, or booklets with materials unrelated to occupations. Criterion measures were taken two weeks following treatments.

Subjects were given post cards addressed to the investigator on which subjects could request occupational information. Receipt of post cards was used as one criterion measure. Subjects from the suburban, middle to upper-middle class high school responded less than did subjects from the other high school. This corresponds to the findings in the banking study (Jones, 1966) which reported similar results. In the less economically-privileged high school, more subjects from the problem-solving treatments sent post cards requesting occupational information than did those in any one of the non problem-solving, information only, or other control groups. The effect did not hold in the middle class high school.

Analysis of other criterion measures, self-report of occupational interest and information-seeking, revealed that some of the problem-solving materials did have significant positive effects on career exploration activities for some of the groups investigated. The effects, however, were relatively small as would be expected for a treatment lasting less than 50 minutes and attempting to modify a major behavior pattern. Subjects from the less privileged community responded more favorably on most criterion measures and among these students, the problem-solving experiences had a more positive influence with boys than did the control materials.

Modeling

Bandura and Walters (1965) described in great detail their conceptions of the role of models for influencing behavioral changes among observers. Based on this important work, Thoresen (1964), Varenhorst (1964) and others cited above employed social modeling techniques to attempt to influence subjects' educational and occupational information seeking. These experimenters directed their attention, however, to one of two types of models defined by Bandura and Walters. In *Social Learning and Personality Development*, Bandura and Walters stated:

> While it is evident that much learning in North American society is still fostered through the presentation of real-life models /̄ social models/, with advances in technology and written and audiovisual means of communication increasing reliance is placed on the use of symbolic models.
>
> *Symbolic models* are presented through oral or written instructions, pictorially, or through a combination of verbal and pictorial devices. Verbal instructions that describe the correct responses and their sequencing constitute one widely prevalent means of providing symbolic models. Indeed, without the guidance of manuals and directives members of technologically advanced societies would be forced to engage in exceedingly tedious and often haphazard trial-and-error experimentation (p. 49).

In the remainder of text, Bandura and Walters said little more about written directives for guiding behaviors of subjects or observers but did devote considerable space to describing studies of film-mediated symbolic modeling. As a consequence, the characteristics of written, verbal models were not defined, nor was experimental evidence presented relevant to such a form of symbolic model.

More in line with the development of interests, Thorndike (1935) proposed, also, that interests may be modified by conditioning by rewards and punishments, contiguity, imitation and suggestion. Thorndike, like Bandura and Walters, did not say in what form the suggestions and directives might take or whether some forms were more or less effective than others.

Recently, Berlyne (1960,1965) has proposed a theory of exploratory behavior in which he discussed "orienting stimuli," stimuli which may be used to orient or direct the subject's attention to particular events, objects or conditions in the environment. Berlyne's work has served as a basis for developing and applying the experimental variables of choice, specificity of questions and notice of inquiry involved in this study. A brief overview of Berlyne's theory and specific studies concerning the aforementioned variables will clarify much of the theoretical foundation underlying this research.

Berlyne (1960) postulated the existence of an exploratory drive aroused when the individual experiences perceptual or conceptual conflict and reduced if resultant exploratory responses obtain additional information about some aspect of the environment. Conflict is the important determinant of exploratory drive induction, but it is only when the induced level of emotional arousal exceeds an optimal point that the individual will emit exploratory responses in order to produce conflict resolution. Once emitted, exploratory behavior enables the individual to receive environmental information not previously available to him; this information is pertinent to the making of certain decisions which will resolve persisting conflicts.

Whether or not it is necessary to explain observable exploratory actions by inferred internal states is not in question here, even though this writer declines to make such inferences. Berlyne's theoretical discussions and consequent research have contributed to understanding exploratory behaviors in spite of the fact that many of his concepts are hypothetical constructs of questionable validity.

Berlyne (1954, 1957) attempted to identify experimentally some of the characteristics of discriminative stimuli which are capable of eliciting exploratory responses -- responses which, at that time, he called curiosity. Using pictorial presentation of congruous and incongruous stimulus patterns either on cards or by a tachistoscope, he found both that subjects had significantly longer reaction times (Berlyne, 1957) on the incongruous pictures (i.e., with characteristics the subjects had learned by past experience to regard as incompatible) and that they expressed more curiosity about them (Berlyne, 1954). The criterion for curiosity was subjects' responses on a questionnaire which asked them for which cards would they like more information. Besides incongruity, Berlyne (1960) has postulated that stimulus characteristics such as novelty, change, surprisingness, complexity and uncertainty have similar exploratory response evoking capacities. The influence of novelty has been demonstrated amply. Subjects were found to explore an object they had not seen before more than an object to which they had been previously exposed. A second influence was complexity. Varied or irregular stimulation generated more prolonged exploration. The effects of both novelty and complexity have been confirmed with both human and infrahuman species. Berlyne's theory states that "specific exploratory responses, whether unlearned or learned, are likely to result from an aversive condition or condition of heightened drive due to lack of information (subjective uncertainty). Such a condition, which may appropriately be called 'perceptual curiosity,' is apt to result from exposure to novel, surprising, highly complex, or ambiguous stimulus patterns" (1966, p. 30).

Within his theory Berlyne distinguishes between specific exploratory responses which supply the precise information that the subject finds missing and diversive exploration in which the subject seeks out any stimulation that offers novelty, surprisingness, complexity, change, or variety. The present line of research involves both but is primarily concerned with specific exploration. It further involves what Berlyne terms "epistemic" responses through which knowledge or information is acquired "rather than the relatively rudimentary orienting, locomotor, and investigatory responses of animals and very young children which are most likely to be crucial in vocational exploration" (Jordaan,1963, p. 43). Once again, Berlyne believes that stimulus conditions capable of eliciting epistemic exploratory behavior would possess some of these characteristics of novelty, unexpected change and uncertainty, or else would represent a perplexing problem such as the individual experiences when he perceives a gap in available information.

While Berlyne's work has used only the most elementary types of stimulus materials and has involved only minimal criteria of exploratory behavior, the basic ideas can be tested for more complex and important types of human response. In the present line of research the condition of heightened drive due to lack of information is created by the experience of exposing the subject to a rather novel and complex problem-solving situation.

Examples of specific studies by Berlyne that support the selection of the independent variables for this study are important to note.

Concerning choice, Berlyne (1954) exposed an experimental group to a series of factual multiple-choice questions (assumed to induce curiosity), then to a seriesof facts including answers to the questions (assumed to relieve curiosity), and finally to an after-questionnaire in which the questions repeated in an open-ended form. Subjects in this group recalled significantly more of the facts during the after-questionnaire than a control group that went through the same procedure except for the fore-questionnaire. It was found that subjects were more likely to remember the answers to the questions that they had marked in the fore-questionnaire as the 12 whose answers they would most like to know. In applying this information, then to vocational matters, it might be presumed that by offering subjects occupational content areas from which to choose, subjects who received the types of information they preferred would retain this information better, or even acquire more, than would subjects who did not receive the occupational materials they preferred.

Another facet of the present study is to determine the effect of asking specific questions. In one experiment reported by Berlyne (1966) questions about animals were used. The greatest amount of curiosity was generated by questions about the more familiar animals, by questions that subjects found surprising, and by questions that attributed to species characteristics they seemed unlikely to possess. Another experiment showed that curiosity was increased when three, rather than two, alternatives were presented and when subjects were told that the experts themselves were about evenly divided on the correct answer. Such evidence provides excellent guidelines for the type of questions which can be used to generate exploratory responses in career information-seeking. In this experiment specific versus general questions will be posed comparing the two occupations for which each subject will solve problems.

Regarding foreknowledge or notification that information acquired by the subjects will later be applied or called for, no one particular work of Berlyne's provides a basis for the application of this variable. Nevertheless, creating a state of tension or arousal in conjunction with the variables of choice and type of orienting question should under Berlyne's premises lead to increased exploration and information seeking relevant to the topics of concern: in this instance, occupational information.

Summary

Derived from a series of preceding experimental efforts in vocational problem-solving experiences for stimulating career and occupational information-seeking, this study will seek to examine the effects of certain variables involved in the application of the problem-solving kits. The research rationale is drawn from the description of symbolic models by Bandura and Walters and guidelines for developing orienting stimuli from the research and theorization of Berlyne.

In the context of vocational problem-solving sessions, employing materials developed by Krumboltz and others, three variables will be applied to determine their influence upon subsequent occupational information-seeking by the experimental subjects. The variables, termed orienting stimuli in that they direct or guide the subject's attention to events or conditions in his environment, are:

1. Choice Received: i.e., a subject may receive or be denied his choices of a particular set of occupational problem-solving materials.
2. Question Specificity: i.e., a subject may be given specific questions comparing the occupations for which he solved problems or more general questions.
3. Inquiry Notification: i.e., a subject may receive or not receive notice that he will be asked questions about occupational information he has acquired.

This experiment contains certain unique features. One is that this study seeks to isolate factors that contribute to an effective written, verbal, symbolic model for influencing occupational information-seeking by utilizing Berlyne's suggestions. A second is that it represents a test of certain of Berlyne's hypotheses as applied to complex human explorations.

CHAPTER II

EXPERIMENTAL DESIGN AND PROCEDURES

Introduction

The purpose of this investigation was to examine certain variables orienting and guiding students' inquiries into vocational information following the presentation of occupational problem-solving materials. The variables selected were three: choice of occupations worked with in problem-solving sessions, specificity of orienting questions, and notice of inquiry about acquired occupational information. A total of 160 subjects, 80 males and 80 females, selected from the eleventh grade of a volunteer local high school participated in this study. All subjects were involved in treatment conditions; no-treatment controls were not employed. A fixed effects model of a four-way analysis of variance permitted testing the main effects of choice received, question specificity, inquiry notification, sex, and the interaction of these independent variables. The dependent variable was occupational information-seeking as measured by several criteria.

Assessment of the dependent variable, information-seeking, was made on the basis of the frequency of information requests from the subjects, the use of school and non-school informational resources, the information acquired and the attitudes toward the treatment materials and occupational planning by the subjects.

Objectives

In attempting to improve ways of promoting information-seeking among eleventh grade students following the use of occupational problem-solving materials developed in earlier research projects, specific ways of tailoring these materials to the preferences and interests of individuals were tested according to the following objectives:

1. To determine the effect of giving students their choice of problem-solving materials.
2. To determine the effect of adding specific questions for students to explore after problem solving.
3. To determine the effect of assuring students an opportunity to make use of the information to be sought.

The practical benefits to be derived by counselors from this experiment are considerable. It should be found whether it is more beneficial to the student to try the occupations he prefers than it is to try occupations for which his initial preference is low. Arguments may be made for either giving students what they want or broadening the base of their experience, but this experiment should cast some light on the relative merits of these two alternatives. Also it is expected to be learned whether asking the student to make specific comparisons between occupations is preferable to asking him more general questions. It is important that the student learn to evaluate career opportunities, and counselors need to know what type of questions will facilitate this. Finally, some information should be received about whether counselors should schedule future appointments to discuss the results of student deliberations and exploration with the view that the very scheduling of such an appointment may have motivating value. While it is expected that the effects of these independent variables are additive, it is possible that certain combinations of them produce unusually high or low results. Such possibilities can be studied through the analysis of the interactions.

Hypotheses of This Experiment

From the discussion in Chapter I about the concept of orienting stimuli and their relevance to vocational guidance, specific hypotheses are developed. The following directional research hypotheses are tested in this investigation:

Hypothesis One -- Students who are given their first choices of occupational problem-solving materials will respond more positively on criterion measures than students not given their first choices.

Hypothesis Two -- Students who are given specific questions comparing the merits of the two occupations they study will respond more positively on the criterion measures than will subjects given general questions about occupations.

Hypothesis Three -- Students who are notified that they will be asked to discuss their reactions and findings following problem solving will respond more positively on the criterion measures than will subjects who are not so notified.

The three hypotheses were evaluated by analysis of variance procedures which tested these statistical null hypotheses:

1. No difference exists between the mean scores of the criterion measures attributable to the receipt or denial of choice of occupational materials.
2. No difference exists between the mean scores of the criterion measures attributable to specificity of

orienting questions.

3. No difference exists between the mean scores of the criterion measures attributable to notification that reactions and information acquired will be requested.

Findings by Krumboltz and Thoresen (1964) and Krumboltz and Schroeder (1965) indicated that female subjects engaged in more information seeking than did male subjects. Jones (1966) partially replicated these earlier results; however, Krumboltz (1967a) found inconsistent sex differences in occupational information-seeking relative to the general socio-economic setting of the school which the subjects attended. Evidence accumulated in the works of Strong (1943), for example, indicated that sex must be considered a prime variable with regard to occupational choice. In the present study, no hypothesis was posed about sex differences in relation to occupational information-seeking. For the purposes of data analysis, therefore, a statistical null hypothesis concerning sex differences was tested:

4. No difference exists between the mean scores of the criterion measures attributable to the sex of subjects.

Further, in view of the exploratory character of this experiment, no hypotheses were framed for interactions among the four independent variables. Again for data analysis a statistical null hypothesis was tested:

5. No difference exists in mean scores of the criterion measures attributable to the interactions among choice received, specificity of questions, notification of

post-treatment inquiry and sex.

Experimental Design

Campbell and Stanley (1963) described a variety of experimental and quasi-experimental designs for research. An extension of their design 6 (p. 195), "The Posttest-Only Control Group Design," was employed for this experiment. A control group, in the sense of a no-treatment control group, was not used in this study. In line with Campbell's and Stanley's discussion of factorial designs (p. 197) for Design 6, the control group was regarded as another treatment group. Certain advantages accrue in the use of Design 6 as adapted for this study. First, the design is a "true" experimental design, because internal sources of invalidity are controlled (p. 175 ff). Second, the design as adapted for multiple factors improves the external validity or generalizability of any main effect by providing information about specificity of effects and the presence of significant interactions (p. 199), as well as improving the estimate by sampling error for increased statistical precision (p. 201).

The four independent factors were each varied on two levels. Randomization procedures were used to select subjects and to assign them to treatment groups. These conditions and procedures resulted in a 2x2x2x2 fixed effects analysis of variance with equal replications within cells (Hays, 1965). The variable of "specificity of questions" could be considered as a continuous variable, two levels of which were sampled and applied in this study. In such a case a mixed effects model for variance analysis would be warranted. Random sampling of levels of this variable were not made; however, two extreme levels were purposely chosen and applied. Consequently, the fixed effects model was employed with the understanding that generalization of results across varying levels of specificity is curtailed.

Table 1 illustrates the design of the experiment and the number of subjects assigned to each cell.

TABLE 1

NUMBER OF SUBJECTS ASSIGNED TO EACH CELL
OF THE EXPERIMENTAL DESIGN

		First Choices Received		First Choices Denied		Total
Notified of Inquiry	Specific Questions	10	10	10	10	40
	General Questions	10	10	10	10	40
Not Notified of Inquiry	Specific Questions	10	10	10	10	40
	General Questions	10	10	10	10	40
	Total	40	40	40	40	160

Subjects

The subjects used in this study were eighty males and eighty females enrolled in the eleventh grade of a volunteer high school. The high school, Sequoia Union High School of Redwood City, California, is located in a suburban setting drawing its students from a broad socio-economic range. The experimental sessions were applied in nine English classes which provided a total pool of two hundred ten students from which one hundred sixty were selected. Three of these English classes contained the entire low verbal ability group of the eleventh grade: students scoring at or below the 20th percentile on the school's English achievement test. School personnel considered these students to have little ability for post-high school education. The remaining English classes contained students with broadly varying verbal abilities.

Vocational Problem-Solving Materials

In view of the purpose of this experiment -- to examine certain variables for promoting occupational information-seeking among subjects who had received and worked with vocational problem-solving materials -- a description of the problem-solving materials or kits is necessary. Sheppard's (1967) report of a pilot study in vocational problem-solving included a reproduction of one kit. Unfortunately, the expense and complexity of the more recently developed materials precludes their being appended to this research report. The following description based on Krumboltz' (1967a) study of booklet-mediated vocational simulation will define the salient characteristics of the problem-solving kits.

Selection of Occupations

The decision about which particular occupations should be selected was important. The criteria established to aid in the choices of an appropriate set of occupations were:

1. The occupations selected must not be "glamour" jobs to which many students already aspire on the basis of superficial information.
2. The occupations must be in social demand according to the best estimates available to the U.S. Department of Labor (1966) and the demand should be clearly present in the local area where the study is conducted.

3. The occupations should involve a variety of skills.
4. The occupations should involve no rare or unusual skills.
5. The occupations should encompass a number of lesser levels of skill or related occupations to accommodate individuals of varying talents or abilities.
6. The occupations must be open both to men and women.

On the basis of these criteria seven occupations were selected in relation to three different projects (Sheppard, 1967; Krumboltz, 1967a; and Krumboltz, 1967b). The occupations for which problem-solving materials were developed were:

1. Accountant: D.O.T. 160.188 (Krumboltz and Sheppard, 1965).
2. X-Ray Technician: D.O.T. 078.368 (Krumboltz and Johnson, 1966b).
3. Medical Laboratory Technologist: D.O.T. 078.281, .381, .687 (Krumboltz and Johnson, 1966a).
4. Sales person: D.O.T. 260.-290.068, .118, .128, .158, .250, .258, .383, .858 (Krumboltz and Baker, 1966)
5. Police Officer: D.O.T. 375.118-.868 (Krumboltz and Bergland, 1967).
6. Appliance Serviceman: D.O.T. 723.381 (Krumboltz and Nelson, 1967).
7. Electronic Technician: D.O.T. 722.281 (Krumboltz, Hamilton and Southern, 1967).

Seven occupations cannot possibly represent adequately all the fields of occupational endeavor. It was presumed, however, that they provided a sufficient sample of jobs to determine whether or not the interest-generating materials would be effective.

Development of the Problem-Solving Materials

The development of the vocational problem-solving booklets for the seven occupations followed a common plan. Representative problems encountered by workers in each of the occupations were isolated. It is important to emphasize that the jobs were examined from the standpoint of the problems solved by workers in particular jobs, not from the standpoint of job descriptions or characteristics. For example, a medical laboratory technologist must be able to use a binocular microscope; this is a job characteristic or requirement. Further, he must be able to classify types of corpuscles and reach a conclusion based on the resulting blood count; this is a problem-solving condition within this particular job. From a list of possible problems those that lent themselves to convenient construction into booklet or kit form were chosen. Library resources and the advice of workers in these occupations contributed to the final decisions about the problems presented.

The following criteria were established to guide the preparation of these materials:

a. The problem should be representative of the type of problem faced by members of the chosen occupation.

b. The problem should be worded in sufficiently simple language that reading ability is not a significant factor in problem solution for ninety-five per cent of the target population.

c. The problem should be of such a nature that it is intrinsically interesting to the majority of the target population.

d. The difficulty level of the problems in the initial materials should be established so that approximately seventy-five per cent of the target population can solve the problems successfully within 50 minutes, which is the typical length of a class period.

e. Representatives of the particular occupation will judge the problem-solving tasks as representative of their occupation.

The problems selected were: (1) for sales, preparing a sales presentation geared to the interests or needs of a prospective customer;

(2) for medical laboratory technology, identifying and classifying types of blood cells; and (3) for medical X-Ray technology, identifying defects in X-Ray plates; (4) for accounting, examining check records and bank statements for errors; (5) for law enforcement, routine police procedures at the site of an accident and robbery; (6) for electronics technician, checking circuitry and testing for faulty components; and (7) for appliance repair, diagnosing malfunctions in small electrical appliances.

Preliminary manuscripts of the booklets were prepared and tested individually on four to six students from the target populations. The students' performances were carefully observed and recorded in order to detect difficulties arising from unclear directions and descriptions, level of vocabulary, faulty organization of material, and unrealistic time allotments. At this developmental stage the manuscripts were submitted to experts in these occupations for their comments and suggestions regarding the accuracy of the informational content and the realism of the problem presented.

The manuscripts were revised to incorporate the comments, suggestions, and observations obtained from the earlier stages of development. The resulting booklets contained the following characteristics:

1. The materials described the importance of the particular job, information needed to solve a problem, tests to ascertain comprehension of the instructional content, problems, and their solutions. The presentation of information, questions, problems, and answers followed a modified programed instructional design. Questions and problems became progressively more difficult within each text, but the cumulative tallying of scores for correct answers provided periodic rewards for students.

2. The language employed throughout the texts was colloquial and adjusted to the target population. Unusual or technical terms were carefully defined. Slang expressions were avoided however, to preclude dating the materials or emphasizing regional language fashions.
3. The covers, bindings, and printing were identical for all texts; each was also the same dimension, 81/2" x 11", although the number of pages varied for the different occupational booklets.

Finally, the revised materials were tested on classroom groups of approximately 30 to 35 students each who resembled the eventual target population. Student reactions and any administrative difficulties were taken into consideration in making the final revisions for the major experiment.

Experimental Procedures

The entire project extended over a period of ten days. On the first day of the study was the pre-treatment session; on the second and third days were the treatment sessions. The post-treatment session occurred on the tenth day. The time interval between the pre-treatment and treatment periods was not an important methodological matter, but a constant interval for all groups of subjects between the treatment and post-treatment sessions was critical. The decision regarding the spacing of sessions was based largely on the scheduling convenience for the English classes and the school calendar. It was assumed, however, that at the time of year in which the study was performed -- late spring -- that a one-week interval between the treatment session and the collection of criterion measures would be adequate time for those subjects who desired to collect occupational information to do so. The study of occupational problem-solving by Krumboltz (1967a) employed a two-week criterion interval, but no theoretical or methodological considerations required adherence to this precedent.

Preparation of Research Assistants

Nine persons assisted the investigator in conducting this study. Six of these were guidance doctoral students in the School of Education, Stanford University, who were thoroughly knowledgeable about this and allied studies of vocational problem-solving. Three other assistants were Master's degree candidates in guidance at the same institution. The doctoral students had previously administered these materials in other studies at different schools. In each English class one of these experienced assistants was appointed to supervise the proceedings; each room supervisor had one or two assistants to help distribute and collect materials as well as to answer questions about the problem-solving materials. All project assistants, irrespective of their familiarity with the study were informed, singly or in groups, not to tell subjects about the objectives of the experiment. Information about the study would contaminate the effects of the orienting questions under investigation. Assistants could, however, reply to procedural questions about the materials. General guidelines for classroom management as well as personnel room assignments and schedules were distributed to each assistant (Appendix A).

No incidence of violations of the experimenter's instructions was noted during the experimental sessions or during informal debriefing of the assistants following the pre-treatment and treatment sessions. In the event that questions about the study itself were raised by a subject, assistants were permitted to reply that such questions would be answered after the last meeting of the class by project personnel.

Following the post-treatment session questions about the study were answered by the room supervisors. At that time, of course, all criterion measures had been completed.

Pre-Treatment Session

During the first ten to fifteen minutes in each of the selected English classes a project research assistant was introduced to the students by the instructor. The instructors knew only that the project concerned occupational guidance and that it was being conducted by personnel from the Stanford University School of Education. They did not know the content of the study or procedures to be used with the students. The research assistant explained his purpose and presence in the following manner:

> I am _______________, from Stanford University. During the next two days you are going to have the opportunity to try out some new materials about occupations. These will be different from the kinds of occupational information you usually see. In order to try to give you a choice in the occupational materials you work with, please rank the seven occupations on the preference form (see Appendix A) that is being passed to you. (Distributed form and read aloud the directions emphasizing that not everyone would receive his first choices, because too few kits were available, but each student would have an equal chance to receive his choices.)

In the event that a student claimed that he liked none of the seven occupations he was asked to rank them in relation to his overall preferences even though none were jobs in which he would presently choose to be employed. If a student asked what a certain occupation was and what it involved he was given that information. All students in project classes completed the preference forms; less than ten of the 210 students posed either of the two exceptional conditions cited above. Once the forms were completed the research assistant collected them, thanked the students and left the room.

Selection and Assignment of Subjects to Treatments

The selection of experimental subjects from the sample pool and their assignment to treatment conditions deserves more explanation than the statement, "Subjects were randomly assigned to treatments."

From the preferential rating forms obtained from the students during the pre-treatment session the first two choices of each were recorded on a tally sheet, the students being identified by a subject number. From the seven occupations offered for ranking, twenty-one combinations of first-two-choices could be generated. The combinations of occupations and the frequency of subjects choosing each of the combinations is shown in Table 2.

Inspection of Table 2 reveals a relatively more varied distribution of male occupational choices than female occupational choices; the distribution of male choices was quadri-modal, that of females bi-modal. Only one occupational combination for males was unchosen by subjects, but for females five were unchosen. As a subsidiary analysis, no difference between the male and female distributions was hypothesized. χ^2 was 335.19, with 20 degrees of freedom, and was significant at $p < .001$ (Walker and Lev, 1953, p. 85). The hypothesis of "no difference" was rejected. The significance of the difference between these two distributions lends justification for employing sex as a principal experimental variable.(See App. H.)

TABLE 2

FREQUENCY OF EACH COMBINATION OF OCCUPATIONS CHOSEN BY MALE AND FEMALE SUBJECTS

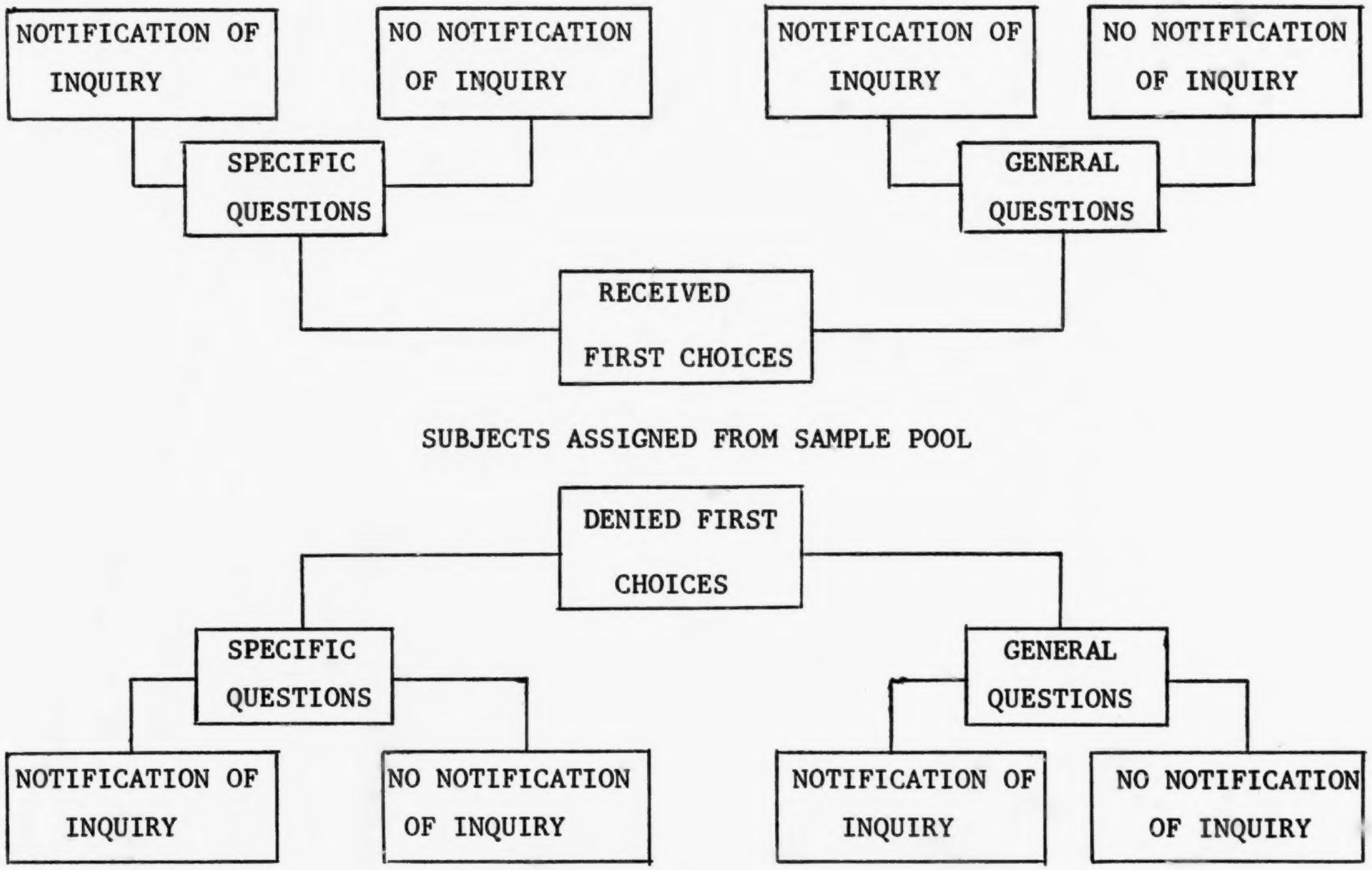
Occupations	Males	Females
Acct/Appl Serv*	1	1
Acct/Elec Tech	6	2
Acct/Med Lab	1	6
Acct/Police	4	3
Acct/Sales	6	22
Acct/X-Ray	1	1
Appl Serv/Elec Tech	10	0
Appl Serv/Med Lab	1	0
Appl Serv/Police	11	1
Appl Serv/Sales	5	0
Appl Serv/X-Ray	0	0
Elec Tech/Med Lab	6	2
Elec Tech/Police	5	2
Elec Tech/Sales	5	4
Elec Tech/X-Ray	14	0
Med Lab/Police	4	6
Med Lab/Sales	1	15
Med Lab/X-Ray	9	23
Police/Sales	13	9
Police/X-Ray	3	2
Sales/X-Ray	2	3
Total	108	102

*The seven occupations are abbreviated as follows:
Accountant = Acct
Appliance Serviceman = Appl Serv
Electronics Technician = Elec Tech
Medical Laboratory Technologist = Med Lab
Police Officer = Police
Salesperson = Sales
Medical X-Ray Technician = X-Ray

Diagram 1 illustrates the general assignment design for male subjects. The identical design applied also to female subjects. For each sex a total of eight treatment cells are generated combining the two levels within each of the three independent variables.

DIAGRAM 1

ASSIGNMENT OF MALE SUBJECTS TO TREATMENT CONDITIONS


NOTIFICATION OF INQUIRY
NO NOTIFICATION OF INQUIRY
NOTIFICATION OF INQUIRY
NO NOTIFICATION OF INQUIRY
SPECIFIC QUESTIONS
GENERAL QUESTIONS
RECEIVED FIRST CHOICES
SUBJECTS ASSIGNED FROM SAMPLE POOL
DENIED FIRST CHOICES
SPECIFIC QUESTIONS
GENERAL QUESTIONS
NOTIFICATION OF INQUIRY
NO NOTIFICATION OF INQUIRY
NOTIFICATION OF INQUIRY
NO NOTIFICATION OF INQUIRY

Two particular variables were recognized which would advantageously be controlled or equalized within treatment cells: (1) occupational preference and (2) occupational experience. Occupational preference refers to the first two choices of occupations subjects indicated on their preferential rating forms. Occupational experience refers to the problem-solving kits the subjects actually work with during the treatment sessions. These two variables could be controlled at one time under ideal circumstances, that is, given a large enough subject sample to insure that each combination of occupations would be chosen by approximately ten subjects. The reason for describing "ideal circumstances" in this fashion can be quickly explained. Controls for occupational preference and occupational experience entail somewhat different subject assignment considerations in relation to the requirements of the experimental design. If occupational preference were to be held constant across all treatments, only occupational preference combinations with at least eight subjects each could be used. Four of these subjects would be assigned to receive their choices and four would be denied their choices. If occupational experience is to be held constant in all treatment cells, and given that insufficient numbers of subjects have the same occupation preferences, then an alternative procedure could be devised. Only occupational preference combinations with four or more subjects would be randomly assigned to the four cells within the "choice received" category; all others could be randomly assigned within the "choice denied" category. There were an insufficient number of pairs of first choices to proceed completely with the first plan. Table 2 shows that only nine occupational combinations, in both sex groups, contained eight or more subjects. Consequently, ideal assignment procedures controlling for both preference and experience simultaneously could not be implemented. Wherever possible, subjects were assigned in order to equalize initial preferences. The remainder of subjects were assigned to equalize experiences, recognizing that subjects would be randomly assigned for only two of the three independent variables, question spcificity and inquiry notification, but not choice. Data analyses were separated for each assignment condition. Analyses involving controls over occupational experiences were based on ten subjects per treatment cell -- 80 males and 80 females (See Diagram 1). Analyses of data involving controls over occupational preferences were based on four subjects per cell -- 32 males and 32 females.

The distribution of occupational problem-solving experiences in each treatment cell for males is given in Table 3: for females in Table 4. The distribution of initial occupational preferences for the subjects meeting the assignment conditions described above are given in Table 5, and the distribution of problem-solving experiences for those subjects in the design for which initial preferences are counterbalanced is given in Table 6.

TABLE 3

DISTRIBUTION OF OCCUPATIONAL COMBINATIONS IN EACH CELL OF THE MALE SUBJECT GROUP

(Occupational Problem-Solving Experience Counterbalanced)

Occupational Combination		Frequency of Combination in Each Treatment Cell
Acct/Elec Tech		1
Acct/ Police		1
Acct/Sales		1
Appl Serv/Elec Tech		1
Appl Serv/ Sales		1
Elec Tech/Med Lab		1
Elec Tech/Police		1
Elec Tech/Sales		1
Med Lab/X-Ray		1
Police/Sales		1
	Total	10

TABLE 4

DISTRIBUTION OF OCCUPATIONAL COMBINATIONS IN EACH CELL OF THE FEMALE SUBJECT GROUP

(Occupational Problem-Solving Experience Counterbalanced)

Occupational Combination		Frequency of Combination in Each Treatment Cell
Acct/Med Lab		1
Acct/Sales		2
Elec Tech/Sales		1
Med Lab/Police		1
Med Lab/Sales		1
Med Lab/X-Ray		3
Police/Sales		1
	Total	10

TABLE 5

DISTRIBUTION OF INITIAL OCCUPATIONAL PREFERENCES IN EACH TREATMENT CELL BY SEX

(Occupational Choice Counterbalanced)

Sex	Initial Occupational Preferences		Frequency of Combination in Each Treatment Cell
Male	Acct/Sales		1
	Appl Serv/Elec Tech		1
	Med Lab/X-Ray		1
	Police/Sales		1
		Total	4
Female	Acct/Sales		2
	Med Lab/X-Ray		1
	Police/Sales		1
		Total	4

TABLE 6

DISTRIBUTION OF OCCUPATIONAL PROBLEM-SOLVING EXPERIENCES DURING TREATMENT SESSIONS FOR EACH LEVEL OF CHOICE BY SEX

(Occupational Choice Counterbalanced)

Occupational Experiences	Choice Received		Choice Denied		
	Males	Female	Males	Females	Totals
Acct/Elec Tech	0	0	3	0	3
Acct/Med Lab	0	0	0	1	1
Acct/Police	0	0	1	0	1
Acct/Sales	2	8	0	2	12
Appl Serv/Elec Tech	4	0	2	0	6
Appl Serv/Sales	0	0	2	0	2
Elec Tech/Med Lab	0	0	1	0	1
Elec Tech/Police	2	0	3	0	5
Elec Tech/Sale	0	0	2	1	3
Med Lab/Police	0	0	0	1	1
Med Lab/X-Ray	4	4	1	9	18
Police/Sales	4	4	1	2	11
Totals	16	16	16	16	64

From the array of occupational combinations in Table 2 for each sex those having been chosen by four or more subjects were used to provide the pool from which the "choice received" treatment group was selected. Four subjects, each having chosen the same pairs of occupations, were randomly assigned, one to a cell, to the four cells representing all combinations of question specificity and inquiry notification.

Krumboltz' vocational problem-solving study (1967a) found significant interactions for sex and type of occupational experience; main effects for occupation also appeared on certain measures. In brief, the conclusion was warranted that problem-solving kits for different occupations will differentially affect subjects' responses on the criterion measures. Should the distributions of occupational problem-solving experiences have differed among the treatment cells for each sex, comparisons among them would have had doubtful meaning. Each treatment condition in this study, therefore, had identical occupational problem-solving distributions within each sex grouping. The actual assignment proceeded in the following manner. A subject was randomly selected from an occupational choice category having four or more subjects. Each subject in such a category was numbered. If eight subjects had chosen a particular combination of occupations, they would be numbered one through eight. By use of a table of random numbers (Blommers and Lindquist,1960) four subjects were selected on the basis of the occurrence of the four numbers, eight or below in the random table. The subject was then randomly assigned to one of the four treatment cells in the "choice received" condition by a roll of a die. The first roll placed the subject in either the "specific question" treatment (even number appearing) or the "general question" treatment (odd number appearing). The second roll placed the subject in either the "notified of inquiry" group (even number appearing) or the "not notified of inquiry" group (odd number appearing). A second subject was randomly selected from this same occupational choice category and randomly assigned to one of the three remaining "choice received" treatment cells. This procedure was reiterated until four subjects, each having chosen the same occupations, were randomly assigned, one to a cell.

Among the males, thirteen occupational preference combinations contained four or more subjects. Ten of these combinations were randomly selected by the means used to select subjects, and four subjects were drawn from each category according to the preceding description.

When eight or more subjects endorsed a particular combination of occupations, all eight were randomly assigned, as described, to the eight possible cells. Under these circumstances all subjects (but a smaller number) were randomly assigned to all three independent variables. Table 5 indicates that such control was applied to 64 subjects, four of each sex in each treatment cell.

To this point, 40 male subjects had been selected and assigned, ten to each of the four "choice received" cells, and 16 subjects had been assigned, four each, to the "choice denied" cells. To bring the total number of subjects in each "choice denied" cell to ten, one of the pairs of occupations represented in the "choice received" condition was identified at random by the first appearance of an identifying number of ten or less in a table of random numbers. Subjects were eligible to be in the "choice-denied" treatment and to receive these two occupational kits, provided that neither of the kits had been indicated as their first two choices. For example, if the combination of medical technology and electronic technician were represented in the "choice received" group by one subject in each of the four cells, all subjects remaining unassigned in the pool who had not selected either medical technology or electronic technician as one of their first choices were listed. Four subjects were selected at random from among them, assigned, one each, to a "choice denied" treatment cell, and received the medical technology and electronic technician kits during the treatment sessions. The selection and assignment procedures from the list of subjects eligible for the "choice denied" treatment were identical to those of the "choice received" group. The process was reiterated until all ten combinations of occupations in "choice received" treatment were matched by ten identical combinations of occupations in the "choice denied" treatment.

The methods employed in the selection and assignment of male subjects to treatments were repeated for female subjects. The only differences between the sex groups were in the number and array of occupational choice categories. Table 2 shows only seven preference combinations of occupations had four or more female subjects endorsing them. Consequently, the experimenter could not randomly select categories as he had been able to do with the male subject group. At the outset of assigning females to treatments a random selection of occupational choice categories was attempted: five of the seven were randomly chosen. The problem that arose, however, was that as a result of the narrow range of female occupational preferences -- localized in the areas of sales and medical laboratory technology -- the number of subjects in the "choice denied" group not having selected sales or laboratory technology among their first two choices became depleted before the assignment process was completed. The decision was made, therefore, to forego the random selection of occupational preference combinations for the female group. Instead, all seven preference combinations of occupations containing four or more subjects were used.

Alternate Subjects and Absentees

All subjects not assigned to treatment cells, as well as those who were absent during the pre-treatment session, but present for the first treatment session were allocated to alternate subject positions. In the event that any of the initially selected subjects were later absent from treatment sessions alternate subjects could replace them. Alternates were assigned singly, at random, to treatment conditions. In all, 50 alternate subjects were available.

Absenteeism was not a serious problem in this study. In the nine instances when replacements were necessary, random selection from identical treatment alternates maintained cell equality. Table 7 shows the distribution of replacements by treatment cell.

TABLE 7

NUMBER OF SUBJECTS REPLACED DURING STUDY BY TREATMENT CELL

		Notified			Not Notified			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Tot.
Choice Received	Specific	1	0	0	0	1	1	1	1	2
	General	1	0	1	1	0	1	2	0	2*
	Total	2	0	2	1	1	2	3	1	4
Choice Denied	Specific	1	0	1	0	1	1	1	1	2
	General	0	1	1	2	0	2	2	1	3
	Total	1	1	2	2	1	3	3	2	5
Total	Specific	2	0	2	0	2	2	2	2	4
	General	1	1	2	3	0	3	4	1	5
	Total	3	1	4	3	2	5	6	3	9

*Underlining designates the totals for the levels within each variable.

Treatment Sessions

Each of the two treatment sessions required entire fifty-minute class periods. In this time period supervisors, aided by their assistants, re-introduced themselves and the activities, distributed the materials assigned to each student, observed the conduct of the students to prevent their exchanging materials, and collected the problem-solving materials as soon as subjects had completed them. Only procedural questions about the materials themselves were answered by any of the research assistants.

Each student received two problem-solving kits, one on each of two consecutive days. All students in each of the project rooms received problem-solving materials; all had equal opportunities for receiving additional directions from the assistants. None of the assistants knew, at any time during the experiment, the treatment assignments of the subjects. (The experimenter did not participate in conducting the treatments, but was available at the school in the event that a problem might have arisen.) Also, each subject completed each problem-solving kit within a fifty-minute period.

At the conclusion of the second treatment session each subject was given a set of informational materials contained in a 9½" x 12½" manila envelope. All envelopes were identical outwardly except for the subjects' names in one corner. Envelope flaps were sealed. Within these envelopes were the following contents:

1. For all subjects.
    - (a) A cover sheet describing the contents of the envelope (Appendix B).
    - (b) Two sets of information sheets, one for each of the occupations for which the subject solved problems. The information was reproduced from the Occupational Outlook Handbook (1966) and the Occupational Guide pamphlets.

      Of course, subjects could obtain answers elsewhere, in the library for instance, but information sheets in the packets gave all subjects equal access to information necessary for answering later questions.
    - (c) A post card for requesting more information about the occupations offered in the study or general occupational information (Appendix B).
    - (d) An interview request slip for obtaining an interview with a regular school counselor (Appendix B).
    - (e) An interview request slip for obtaining an interview with a special vocational counselor (Appendix B).

(f) A sheet describing the materials available in the library (Appendix B).

(g) A request slip for new library materials displayed on a bulletin board in the school library (Appendix B).

2. For only those subjects in pertinent treatment groups:

(a) A list of specific questions comparing the two occupations for which they received problem-solving kits (Appendix B).

Questions were considered to be specific when only one response would correctly answer the inquiry. The following are examples of specific questions:

What two occupations did you work with?
#1______________________________
#2______________________________
How much does #1 pay each month at the start?
$________________per month.
How much does #2 pay each month at the start?
$________________per month
Which pays more at the start? ________________.
Name three high school courses you are taking now or have taken that would help you in occupation #1.
a. _______________ b. _____________ c. _____________
In occupation #2.
a. _______________ b. _____________ c. _____________

(b) A list of general questions about the two occupations for which they solved problems (Appendix B).

Examples of general questions are:

Do these jobs pay enough?
What knowledge do these jobs require?
What qualifications would a person need to get these jobs?

For these questions a broad range of answers would be satisfactory.

The specific and general questions comparing the two occupations pertained to the same content areas: income, skills and qualifications required, sources of training, and prospects for the future. The exact difference between specific and general questions was difficult to define. Berlyne's works as previously cited contain few directives or standards for differentiating qualities of specificity. This experimenter chose to define a specific question as an inquiry for which only one response would be correct. A general question was one for which a broad range of responses would suffice. A pilot study was conducted to examine the effects of the two question types and no questions at all on the sending of post card requests for information. Four hundred four female subjects were randomly assigned to receive specific, general or no questions following an occupational problem-solving treatment. A one-way analysis of variance indicated no significant differences at the .05 level. The questions appear in Appendix A. Although the general questions seemed to meet the corresponding definition cited above, specific questions did not, because a variety of responses could possibly be accurate. For the specific questions in the present study, therefore, the possible range of alternative responses was considerably reduced.

(c) A notice that in one week there would be questions asked of them about their reactions to the materials and the information they may have collected in the interim (Appendix B). This notice was worded as follows:

> You will be asked questions about this occupational material and about other career information you find about jobs that interest you. This survey will take place in class on May 4, one week from today.

> We will be interested to know also what you think of the occupational problem-solving kits with which you worked.

Particular attention was given to: (1) specifying that the individual receiving the packet would be asked questions, nothing being implied about the entire class; (2) delineating the content of the inquiry; and (3) announcing the time and date of the inquiry.

Subjects who were assigned to receive no notice of later inquiry into their reactions to the materials or accumulated information received nothing to suggest that such an event would occur. Those, however, who were assigned to receive notice found as they opened the information envelope the notice sheet attached to the inner surface of the envelope flap. The subject could not inspect the contents of the packet without first seeing and removing the notice.

Post-Treatment Session

Seven days following the second treatment session research assistants returned to the project classes and administered a set of survey forms and information tests (see Criterion Instruments and Measures). All subjects received the Student Reaction Sheet, an inquiry into the subjects' reactions to and opinions about the materials and occupation with which they worked, as well as the Vocational Planning Questionnaire, an inquiry into the kinds of informational resources the subjects may have employed during the criterion period. Each subject also received two informational tests, one for each of the occupations assigned to him.

The time required for this administration was approximately thirty minutes. After the instrument sets had been collected, the room supervisor was free to answer any questions posed by the students. Once all questions were answered, the class was returned to the control of the regular instructor.

Criterion Instruments and Measures

The purpose of the study was to find ways of encouraging students to explore vocational opportunities and to deliberate about the meaning of these opportunities for their own vocational choice. Consequently, attempts by the subjects to take advantage of opportunities to explore occupational information, and demonstration of increased occupational knowledge was considered in evidence. The following criterion instruments were used.

1. Amount of information-seeking. Students were presented with a number of standard opportunities to seek further vocational information during the week immediately following the experimental treatment. The following kinds of opportunities were presented to each student in the experiment. (The corresponding forms appear in Appendix B.)

(a) An opportunity to mail a pre-stamped post card requesting occupational information requiring the subject merely to check occupations of interest, affix his own name and address, and mail. The post card was addressed to a faculty member of the School of Education, Stanford University. All requests, therefore, could be recorded.

(b) An opportunity to sign up for an interview with the subject's school counselor. Interview request slips for (b) and (c) below, were routed to the experimenter to enable his recording them.

(c) An opportunity to sign up for a special vocational counseling interview.

(d) An opportunity to use career materials available in the school library. All career and occupational materials in the school library and counseling office were placed on reserve shelves. Students would have to sign for the use of these materials as well as those cited in (e) below.

(e) An opportunity to work on other simulated vocational materials.

2. Scores on achievement tests constructed to assess knowledge of facts relating to the occupations studied. The questions asked on the achievement tests (Appendix C) for each of the seven occupations presented pertained to comparable content. The questions could be answered by reading the information packets in the envelopes and looking at course catalogs for nearby junior and state colleges.

3. Information given on the survey forms. Two survey forms, the Student Reaction Sheet and the Vocational Planning Questionnaire (Appendix C), used by Krumboltz (1967a) were also applied in this study.

(a) The Student Reaction Sheet was developed to obtain the subject's opinions of and reactions to the problem-solving materials he received during the treatment sessions. It further inquired into the subjects' estimated understanding of what people do at these jobs and his estimate of his own success and enjoyment of these tasks.

(b) The Vocational Planning Questionnaire was constructed to obtain information about the information-seeking activities of the subjects during the criterion period. It permitted the recording of reported information seeking in and out of the school setting. An important feature of this form is that it inquires into some areas for which there are also behavioral measures. The validity of the self-reports, therefore, can be tested.

Responding to Subject's Information Requests

Subjects who requested information by post card were sent the specific information about the occupations they indicated, as well as a 424-page book describing over 50 occupations and careers (*Career Opportunities*, 1958). Appendix D contains a letter sent to each subject who requested information.

Subjects who requested counseling interviews received them within one week following the post-treatment session. One member of the research staff, an experienced counselor, conducted the interviews during school hours in facilities provided by the school counseling service.

Methods of Data Analysis

The principal statistical method was a factorial analysis of variance, fixed effects model. All variance analyses were performed on the I.B.M. 7090 Computer by means of the BMD 02V program (Dixon,1964). A correlation matrix was produced by the BMD 02D program.

CHAPTER III

RESULTS AND DISCUSSION

Introduction

This chapter contains the detailed description of the results of the study based on the research hypotheses stated in Chapter II. The sequence of topics presented will be: (1) a description of validations of the self-report data, (2) the tests of each of the research hypotheses in relation to each of the criterion measures, (3) a summarization of results.

Validity of the Self-Report Data

Thoresen (1964) employed inquiry instruments comparable in content to the two self-report instruments, the Student Reaction Sheet and the Vocational Planning Questionnaire, used in this study. Thoresen selected at random ten per cent of his interview protocols and submitted them to validation checks. Efforts were made to confirm or disconfirm the subjects' reports of information collection. The results of these investigations were that 93 per cent of the subjects' responses were confirmed, seven per cent were unconfirmable, and none was disconfirmed. Prior to Thoresen's study, Schroeder (1964) applied a similar technique; both validation efforts produced comparable results.

Validation checks in the field were not performed for this study; the similarity of survey items and student populations among Schroeder's and Thoresen's studies and this study were considered to be sufficiently strong to generalize from their research to this research. However, certain validation checks were built into the behavioral and self-report measures used here.

Behavioral events recorded during the criterion period in the present experiment were:

1. Receipt of the post card request for information.
2. Appointments made or interviews held with school counselors.
3. Interviews requested with special vocational counselor.
4. Occupational materials used in the school library.

Aligned with the behavioral measures were three items in the Vocational Planning Questionnaire; they were Items 1 and 1(b), 2, 4 and 4(b). The specific portions of these items that were of importance were:

1. During the past seven days how much time have you spent talking about your possible future occupations?

    1b. If you did talk with some persons about possible occupations, check who they were:

    ☐ My counselor (s)

2. Did you mail the post card requesting information about occupations?

4. During the past seven days have you read any books or pamphlets about any jobs or about choosing an occupation?

    4b. If you answered "Yes," tell what you can remember about one thing you read.

    Its title was something like:

    I obtained it (Where?):

To compare each behavioral measure with the corresponding report by the subjects a fourfold point correlation, phi, was determined from χ^2 ratios based on 2x2 contingency table analysis (Hays, p. 602, 1965). Table 8 contains the analysis of post cards received by the experimenter and self-reported mailing of post cards by the subjects.

TABLE 8

DISTRIBUTION OF POST CARDS RECEIVED AND POST CARDS REPORTEDLY MAILED

		Did Subject Report Mailing Post Card?		
		No	Yes	Total
Was Post Card Received	Yes	0	10	10
	No	149	1	150
Total		149	11	160

$$X^2 = N(ac-bd)^2/(a+b)(c+d)(a+c)(b+d)$$
$$= 144.48 \ (p < .005)$$
$$\text{phi} = (X^2/N)$$
$$= .95$$

As may be seen in Table 8 only one subject reportedly mailed a post card for which there was no record of receipt. The possibility exists that the card was mailed, but was misplaced in postal processing. Irrespective of this slight possibility, the fourfold point correlation of .95 indicates a strong association among the categories.

TABLE 9

DISTRIBUTION OF SUBJECTS USING SCHOOL LIBRARY FACILITIES AND REPORTED USE OF THESE FACILITIES

		Did Subject Report Using Library Materials?		
		No	Yes	Total
Was Use of Library Materials Recorded?	Yes	0	2	2
	No	158	0	158
Total		158	2	160

$$X^2 = N(ab-bc)^2/(a+b)(c+d)(a+c)(b+d)$$
$$= 160 \ (p < .005)$$
$$\text{phi} = (X^2/N)$$
$$= 1.00$$

Table 9 displays another 2x2 contingency relationship between the recorded use of the occupational and career materials in the school library and the subjects' reports of using these facilities. Here the fourfold point correlation shows complete dependence among categories, and in combination with the preceding phi of .95 implies satisfactory validity for the self-reported data.

The 2x2 contingency table for self reports of counseling interviews and records of counseling interviews appears in Table 10.

TABLE 10

DISTRIBUTION OF SUBJECTS HAVING COUNSELING INTERVIEWS AND REPORTED COUNSELING INTERVIEWS

		Did Subject Report Counseling Interview?		
		No	Yes	Totals
Was Counseling Interview Recorded?	Yes	0	1	1
	No	156	3	159
Total		156	4	160

$$X^2 = N(ab-bc)^2/(a+b)(c+d)(a+c)(b+d)$$
$$= 36.73\ (p < .998)$$
$$\text{phi} = (X^2/N)$$
$$= .48$$

The low phi coefficient for the last fourfold analysis raises questions about the validity of self-reported discussions with other persons about occupational information. No certain explanation may be given immediately for the discrepancy between the two satisfactory correlations and the unsatisfactory one. Several possible explanations, however, may be proposed. One possibility, of course, is that the responses were untruthful as stated. An alternative explanation is that the responses were truthful and that the system for recording interviews, or what the subjects considered to be interviews, failed in some way. As an example, the subjects may actually have had a counseling interview, but made their requests for appointments on forms other than the specially-colored ones provided in the envelopes received following the final treatment session. Were this the case, and in one instance it appeared to be so, the experimenter would have had no record of such an interview. Also, had the subject informally spoken with his assigned counselor during class time, between classes, during lunch periods, or before or after school without formally presenting an interview request, this information would have escaped the attention of the investigator. The low correlation figure, therefore, cannot be dismissed simply as an indication of untruthful responses by the respondent, but possibly as a consequence of uncontrollable or unmeasurable events in the school environment. The quality of the *phi* coefficients pertaining to the post card and library data suggest that the internal consistency of responses to self-report and behavioral measures is sufficiently adequate to warrant further analyses.

Experimental Results: Occupational Experiences Counterbalanced

The criterion measures described in Chapter II involved behavioral records of occupational information-seeking, achievement tests for occupational information, surveys of subjects' reactions, and self-reported information seeking. Data from these criterion content areas was reduced by analysis of variance procedures. For each criterion measure the research hypotheses were tested. A restatement of the research hypotheses follows:

Hypothesis One -- Students who are given their first choices of occupational problem-solving materials will respond more positively on criterion measures than students not given their first choices.

Hypothesis Two -- Students who are given specific questions comparing the merits of the two occupations they study will respond more positively on the criterion measures than will subjects given general questions about occupations.

Hypothesis Three -- Students who are notified that they will be asked to discuss their reactions and findings following problem solving will respond more positively on the criterion measures than will subjects who are not notified.

For statistical analysis these directional hypotheses were reframed in null hypothesis terms. In all, five null hypotheses were tested. They were:

1. No difference exists between the mean scores of the criterion measures attributable to choice.
2. No difference exists between the mean scores of the criterion measures attributable to specificity of orienting questions.
3. No difference exists between the mean scores of the criterion measures attributable to notification that reactions and occupational information acquired will be requested.
4. No difference exists between the mean scores of the criterion measures attributable to the sex of subjects.
5. No difference exists in mean scores of the criterion measures attributable to the interactions among choice, specificity of orienting questions, notification of post-treatment information requests and sex.

The summaries of variance analyses for each criterion measure are given in Appendix E.

Analysis of Behavioral Records

Specifically, the behavioral data was recorded for three performance areas: (1) post card requests for occupational information, (2) counseling interviews with school counselors or interviews requested with a special vocational counselor, and (3) use of the library occupational and career informational resources, as well as further work in vocational problem-solving kits reserved in the library.

Post Card Data.

A summary of the analysis of variance for the mean frequency of post cards received requesting occupational information is given in Appendix E. Cell means are reported in Table 11. Receipt of post cards was scored dichotomously: received or not received. The behavioral factors underlying the mailing of cards were construed to be normally distributed. That is, some subjects declined to mail the cards, some forgot to mail them but intended to, others intended to and stated so (three subjects), some mailed the cards, etc. However, evidence only appears for responses or reactions occurring at an undefined point in the assumed distribution, that of mailing post cards or stating intentions to do so. Analysis of variance procedures which assume a normal distribution of responses or events, therefore were considered appropriate for these data (Winer, 1962, p. 139).

The analysis of variance for post card data clearly indicates a main effect for choice ($p < .001$). Subjects who were given their first choices of occupational problem-solving materials requested occupational information more than did subjects who were not given their first choices. The appearance of such a difference as a function

TABLE 11

MEANS FOR POST CARDS RECEIVED BY INDEPENDENT VARIBLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	0.00	0.30	0.15	0.10	0.10	0.10	0.05	0.20	0.13
	General	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	Total	0.05	0.20	0.13	0.10	0.10	0.10	0.08	0.15	0.13*
Choice Denied	Specific	0.00	0.00	0.00	0.10	0.00	0.05	0.05	0.00	0.03
	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.05	0.00	0.03	0.03	0.00	0.02
Total	Specific	0.00	0.15	0.08	0.10	0.10	0.08	0.05	0.13	0.08
	General	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Total	0.03	0.10	0.07	0.08	0.05	0.07	0.06	0.08	0.07

*Underlining designates the means for the levels within each variable.

of chance alone, if the null hypothesis were true, would be expected less than once in 1000 times. Non-significant trends suggest that specific questions may produce more post card requests than do general questions, and females may tend to send more post cards than do males.

A simple 2x2 contingency analysis of the types of information requested in relation to the subjects receiving or not receiving their first choice is given in Table 12. Chi-square is not large enough to reject the null hypothesis at $p < .05$. The frequencies of requests in the 2x2 table show that subjects who received their first choices of materials requested information about occupations other than their first choices almost as often as they requested information about their first choices. Receiving preferences for kits appears to be related to inquiry into other occupations as much as it is related to inquiry into preferred occupations.

TABLE 12

FREQUENCY OF POST CARD REQUESTS FOR INFORMATION AND RECEIVING FIRST CHOICES OF OCCUPATIONAL MATERIALS

		Did Subject Request Information About First Choices?		
		Yes	No	Totals
Did Subject Receive First Choices	No	0	1	1
	Yes	5	4	9
	Totals	5	5	10

$$X^2 = N(ad-bc)^2/(a+b)(c+d)(a+c)(b+d)$$
$$= 1.11 \ (p \geq .995$$

In determining the F values for the mean squares ratios for the analysis of variance of the post card data, and all other data in this report, the denominator used was a recombination of the sum of squares of the error term and the four-way interaction (Walker and Lev, 1953, p. 363).

Other Behavioral Measures

Recorded use of school informational resources by the subjects was analyzed and cell means are cited in Table 13. Few subjects used the resources of the school during the post-treatment criterion period for gathering occupational or career information. Only one student was recorded as having seen his counselor, two used library occupational materials, and two requested appointments with a special vocational counselor. The frequency and distribution of the responses are given in Table 14.

Base rate information on the use of the library occupational materials by eleventh graders not in the experiment was obtained. None of the non-experimental students used the library resources. Four subjects in the experimental group used these resources, one seeing both a school counselor and a vocational counselor. The two students who used the library materials checked out problem-solving kits, not vocational resource materials.

The responses were too few to form conclusions. The results may reflect, however, a general state or attitude among the students regarding vocational planning, preparation, or inquiry which relatively brief treatment periods cannot alter or influence. Additionally, these behavioral results may indicate that the assistance or benefit gained for the students from these informational resources is negligible, and the treatments could not change subject performances in relation to prior unsatisfactory experiences with these resources. Although no

TABLE 13

MEANS FOR SCHOOL INFORMATIONAL RESOURCES UTILIZATION

BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	0.00	0.10	0.05	0.00	0.00	0.00	0.00	0.05	0.03
	General	0.00	0.00	0.00	0.10	0.20	0.15	0.05	0.10	0.08
	Total	0.00	0.05	0.03	0.05	0.10	0.08	0.03	0.08	0.06*
Choice Denied	Specific	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	General	0.00	0.00	0.00	0.00	0.10	0.05	0.00	0.05	0.03
	Total	0.00	0.00	0.00	0.00	0.05	0.03	0.00	0.03	0.02
Total	Specific	0.00	0.05	0.03	0.00	0.00	0.00	0.00	0.03	0.02
	General	0.00	0.00	0.00	0.05	0.15	0.10	0.03	0.10	0.06
	Total	0.00	0.03	0.02	0.03	0.08	0.06	0.02	0.06	0.04

*Underlining designates means for the levels within each variable.

TABLE 14

FREQUENCY OF USE OF OCCUPATIONAL INFORMATION SOURCES BY TREATMENT CELL

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	0	1(l)*	1	0	0	0	0	1	1
	General	0	0	0	1(v)	2(s/v)	3	1	2	3
	Total	0	1	1	1	2	3	1	3	4
Choice Denied	Specific	0	0	0	0	0	0	0	0	0
	General	0	0	0	0	1(l)	1	0	1	1
	Total	0	0	0	0	1	1	0	1	1
Total	Specific	0	1	1	0	0	0	0	1	1
	General	0	0	0	1	3	4	1	3	4
	Total	0	1	1	1	3	4	1	4	5

*(l) = used library

(s) = school counselor interview

(v) = vocational counselor interview

evidence was gathered in this study to support these conjectures about the factors involved in explaining the experimental results, the level of information gathering by utilization of the school facilities and personnel is a perplexing issue. Krumboltz (1967a) found similar situations in other secondary schools; the school resources -- counselors and libraries -- were scarcely used by the subjects during the brief time observations were made.

Achievement Tests

During the post-treatment session twenty-item, multiple choice achievement tests were administered to the subjects. Each subject received two tests, one pertaining to each occupation for which he solved problems in the treatment session. The data from the two tests was analyzed separately as a check on the reliability of the results. Discrepant outcomes from the two analyses would have raised doubts about the meaningfulness of such scores. The tests were separated for analysis on the basis of the order in which subjects received the problem-solving kits; tests for the occupations worked with in the first treatment period were analyzed as a group and those for the second analyzed as another group. The results of the two analyses were virtually identical. Table 15 lists the cell means for the scores for Achievement Test I.

Scoring the achievement tests was based on the number of correct responses: one point given for each correct answer. Appendix G contains the raw score distributions for the achievement tests. All scores were transformed to standard score distributions having means of fifty and standard deviations of ten (McNemar, 1960, p. 38)

Inspection of the variance analysis shows significant main effects for orientation and foreknowledge at $p < .05$ and one significant inter-

TABLE 15

MEANS FOR SCORES ON OCCUPATIONAL ACHIEVEMENT TEST 1 BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTALS		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	52.72	51.28	52.00	50.48	46.34	48.41	51.60	48.81	50.21
	General	50.83	49.92	50.38	48.40	52.01	50.21	49.62	50.97	50.30
	Total	51.78	50.60	51.19	49.44	49.18	49.31	50.61	49.88	50.26*
Choice Denied	Specific	58.13	55.22	56.73	50.86	46.18	48.51	54.50	50.75	52.62
	General	44.46	48.36	46.41	47.32	43.69	45.51	45.88	46.03	45.96
	Total	51.30	51.79	51.57	49.09	44.94	47.01	50.20	48.37	49.29
Total	Specific	55.43	53.25	54.37	50.67	46.26	48.46	53.05	49.76	51.42
	General	47.65	49.13	48.40	47.86	47.85	47.86	47.76	48.49	48.13
	Total	51.54	51.20	51.39	49.27	47.06	48.16	50.41	49.13	49.78

*Underlining designates means for the levels within each variable.

action between the variables of choice and specificity,also significant at $p < .05$. The marginal means data shows that subjects who received specific questions comparing the two occupations on which they worked scored higher than did subjects who received general questions. Also, subjects who received notice that they would be asked to answer questions about the occupations for which they solved problems scored higher on the test than did those who received no notification. The pattern of significant main effects seems completely reasonable in terms of the criterion measure. Individuals who were told that they would be asked questions and were given specific guides for making comparisons between the occupations assigned to them answered correctly more questions than did those individuals who were neither notified nor given specific orientation for comparing occupations. The effects of specificity of orientation and notice of inquiry were maintained for both sexes and both the choice and non-choice treatment groups. Trends in the means for sex and choice, however, showed males scoring somewhat higher than females and those subjects receiving first choices scoring higher than those not receiving their first choices. The latter trend, of course, was in accord with the hypothesized direction.

A significant interaction occurred between choice and question specificity. Subjects who received specific questions for comparing occupations but who did not receive their first choices of kits scored higher in the achievement testing than did those who received specific questions and also received their first choices. The type of orienting questions apparently had little differentiating influence among those who received their first choices of problem-solving materials: both groups having nearly equal means. Question type had considerable influence in the "non-choice" group: means here being the extremes of the range of mean scores.

The results of the analysis of scores on Achievement Test II closely parallel those of the preceding analysis. The question specificity main effect and the choice-specificity interaction were again significant ($p < .05$); inquiry notification was not a significant main effect (at $p < .05$); it approached significance at that level, however. A second order interaction appeared among choice, question specificity, and inquiry notification. Specific questions produced higher achievement scores than general questions only among students denied their choice but notified of the inquiry. All means (Table 16) for these treatment combinations again showed that subjects in the "choice" group obtained much less variable scores than those in the "non-choice" group.

Trends in cell means for the non-significant main effects again showed males tending to score higher than females on the tests and those subjects who did not receive their first choices scoring slightly higher than those who did. The trend within the levels of choice for the second Achievement Test reversed that of the analysis of the first Achievement Test, but because mean differences were significant for neither test little can be discussed or implied about the trends. The reappearance of the interaction of choice and question specificity lends support to the conjecture that subjects who received their first choices were less influenced by the type of orienting questions comparing the occupations than were subjects who did not receive their first choices.

TABLE 16

MEANS FOR SCORES ON OCCUPATIONAL ACHIEVEMENT TEST 2 BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTALS		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	53.70	46.54	50.12	52.11	47.70	49.91	52.91	47.12	50.02
	General	50.50	53.70	52.10	49.51	46.84	48.18	50.01	50.27	50.14
	Total	52.10	50.12	51.11	50.81	47.27	49.05	51.46	48.70	50.08*
Choice Denied	Specific	58.49	56.01	57.25	49.59	49.58	49.59	54.04	52.80	53.42
	General	47.40	46.17	46.79	49.26	47.29	48.28	48.33	46.73	47.54
	Total	52.95	51.09	52.02	49.43	48.44	48.94	51.19	49.77	50.48
Total	Specific	56.10	51.28	53.69	50.85	48.64	49.75	53.48	49.96	51.72
	General	48.95	49.94	49.45	49.39	47.07	48.23	48.17	48.50	48.84
	Total	52.53	50.61	51.57	50.12	47.86	49.00	51.33	49.24	50.28

*Underlining designates means for the levels within each variable.

Student Reaction Sheet

Analysis of the Student Reaction Sheet data was performed first for the total scores summed over the eight items, and then for each item in turn. Individual scores were determined by the number of the item alternative marked by the subject. All items were keyed in such a way that the higher score values represented the more favorable response directions.

The analysis of variance results for the total Student Reaction Sheet scores are cited in Appendix E. Cell means are given in Table 17. The analysis of variance summary displays two significant main effects: choice and sex, $p < .001$ and $p < .025$, respectively. The cell means show that subjects who were given their first choices expressed much more positive reaction to the problem-solving materials, their opinions about their own job performances and estimates of work success than did subjects who were not given their first choices. Also, females responded more positively in their reactions to the materials than males did.

Trends in the means of the levels of question specificity and inquiry notification favor specificity of questions and notification of reporting reactions, respectively. These trends are slight, but in the hypothesized directions. Two significant interactions appeared: one between choice and inquiry notification and another among choice, question specificity and sex. In the first interaction, unnotified subjects who received their choices reacted overall more favorably than did unnotified subjects who were denied their first choices; for notified subjects, receiving or not receiving their choices made no difference. In the second interaction, males who received their choices responded

TABLE 17

MEANS FOR TOTAL SCORES ON THE STUDENT REACTION SHEET

BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	25.90	28.60	27.25	29.50	31.10	30.30	27.70	29.85	28.78
	General	28.30	28.10	28.20	28.10	29.60	28.85	28.20	28.85	28.53
	Total	27.10	28.35	27.73	28.80	30.35	29.58	27.95	29.35	28.66*
Choice Denied	Specific	27.20	29.00	28.10	26.60	24.70	25.65	26.90	26.85	26.88
	General	25.60	28.40	27.00	23.70	27.40	25.55	24.65	27.90	26.28
	Total	26.40	28.70	27.55	25.15	26.05	25.60	25.78	27.38	26.58
Total	Specific	26.55	28.80	27.67	28.05	27.90	27.98	27.30	28.35	27.83
	General	26.95	28.25	27.60	25.90	28.50	27.20	26.48	28.38	27.41
	Total	26.75	28.53	27.64	26.98	28.20	27.59	26.87	28.37	27.62

*Underlining designates means for levels within each variable.

more favorably when given general instead of specific questions; when denied their choices, males responded better to specific questions. Females responded oppositely in both circumstances.

Student Reaction Sheet Item 1

> To what extent would you like to work on another booklet written in the same manner as the ones you worked on one week ago?

Table 18 presents cell means by independent variable categories.

The variance analysis for the total score and Item 1 reveal close similarities. The two differ only in that the second-order interaction occurring in the total score analysis is absent in the latter analysis.

The interpretations assigned to the analysis of the total scores differ, however, from those of Item 1. The total score interpretations were placed in terms of the subjects' overall reactions to the materials, subjective estimates of job content and their success and enjoyment of such work. Item 1 much more specifically denotes the wishes of the subjects to work with other materials comparable to the problem-solving kits they were assigned in treatment. Subjects having been given the preferences of occupational kits strongly indicated the desire to work more with similar materials. A significant main effect appeared also for sex; females wishing to work with additional problem-solving kits more than did males. Trends in group means for the levels within the non-significant main effects showed that those who received specific questions were more favorably inclined toward working with more problem-solving materials than those who received general questions. Subjects who were not notified about later inquiries into their reactions

TABLE 18

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 1

BY INDEPENDENT VARIABLE CATEGORIES

To what extent would you like to work on another booklet written in the same manner as the ones you worked on one week ago?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	3.60	3.70	3.65	4.10	4.70	4.40	3.85	4.20	4.03
	General	3.80	3.70	3.75	4.10	4.70	4.40	3.95	4.20	4.08
	Total	3.70	3.70	3.70	4.10	4.70	4.40	3.90	4.20	4.05*
Choice Denied	Specific	3.40	4.20	3.80	3.30	2.80	3.05	3.35	3.50	3.43
	General	2.70	3.80	3.25	2.80	3.90	3.35	2.75	3.85	3.30
	Total	3.05	4.00	3.53	3.05	3.35	3.20	3.05	3.68	3.37
Total	Specific	3.50	3.95	3.73	3.70	3.75	3.73	3.60	3.85	3.73
	General	3.25	3.75	3.50	3.45	4.30	3.88	3.35	4.03	3.69
	Total	3.38	3.85	3.62	3.58	4.03	3.80	3.48	3.94	3.71

*Underlining designates means for the levels within each variable.

tended to endorse this item more favorably than those who were notified.

A significant interaction between choice and inquiry notification showed that unnotified subjects who received their first choices of kits wanted to work on additional kits more than unnotified subjects who were denied their choices. For notified subjects receipt of choice was not as important.

Student Reaction Sheet Item 2

> To what extent would you like to explore a number of different occupations?

Item 2 inquires into the extent to which subjects would like to investigate a variety of occupations. Significant responses resulted from interactions of main effects. Table 19 gives the cell means.

Trends in means favored the hypothesized directions for the variables of choice and question specificity, but did not for inquiry notification.

The null hypothesis was accepted for no difference in scores due to sex of subjects.

Two significant interactions again involve the variable of choice. The first-order interaction between choice and sex shows that males who received their first preferences of kits expressed interest in exploring more occupations than males who did not receive their preferred materials. The reverse trend held for female subjects. Females who did not receive their first choices desired to look into more occupations than those who did. In the second-order interaction among choice, question specificity and sex, females who were given their first choices along with specific questions and males who received their choices but

TABLE 19

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 2 BY INDEPENDENT VARIABLE CATEGORIES

To what extent would you like to explore
a number of different occupations?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	3.30	3.20	3.25	3.30	3.80	3.55	3.30	3.50	3.40
	General	3.30	2.70	3.00	3.70	3.20	3.45	3.50	2.95	3.23
	Total	3.30	2.95	3.13	3.50	3.50	3.50	3.40	3.23	3.32*
Choice Denied	Specific	2.90	3.20	3.05	3.30	3.50	3.40	3.10	3.35	3.23
	General	2.50	3.60	3.05	2.50	3.00	2.75	2.50	3.30	2.90
	Total	2.70	3.40	3.05	2.90	3.25	3.08	2.80	3.33	3.07
Total	Specific	3.10	3.20	3.15	3.30	3.65	3.48	3.20	3.43	3.32
	General	2.90	3.15	3.03	3.10	3.10	3.10	3.00	3.13	3.07
	Total	3.00	3.18	3.09	3.20	3.38	3.29	3.10	3.28	3.19

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*Underlining designates means for the levels within each variable.

received general questions indicated greater interest in exploring more different occupations than did males and females receiving other combinations of treatments.

Items 3 and 4 Student Reaction Sheet

> Do you now know better exactly what people in those occupations do?
>
> Did you find that you had to change some of your ideas about what people in those occupations do?

No significant main effects or interactions appeared in the analysis of these data. For Item 3 cell means are given in Table 20; for Item 4 cell means appear in Table 21.

Trends in group means continued to be higher for the "choice" treatment and females. Trends were mixed for the "question specificity" and "inquiry notification" variables between the two items. The null hypothesis for sex differences and interactions of main effects was accepted.

Although no significant differences were found on a statistical basis, examination of the responses to Item 3 show that all treatment groups indicated an improved understanding about what people do exactly at the occupations for which they solved problems. The consensus of responses to Item 4 indicated, additionally, that all subjects changed their ideas somewhat about the tasks at which people work in the areas of their (the subjects') assigned treatment occupations.

Student Reaction Sheet Item 5

> Are you now more certain than before that you could be successful in an occupation?

Students who were assigned the occupational kits that they

TABLE 20

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 3

BY INDEPENDENT VARIABLE CATEGORIES

Do you now know better exactly what people
in those occupations do?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	3.70	4.10	3.90	4.20	4.20	4.20	3.95	4.15	4.05
	General	4.20	4.20	4.20	4.10	4.40	4.25	4.15	4.30	4.23
	Total	3.95	4.15	4.05	4.15	4.30	4.23	4.05	4.23	4.14*
Choice Denied	Specific	3.90	4.20	4.05	4.00	3.70	3.85	3.95	3.95	3.95
	General	3.80	4.10	3.95	3.90	4.00	3.95	3.85	4.05	3.95
	Total	3.85	4.15	4.00	3.95	3.85	4.05	3.90	4.00	3.95
Total	Specific	3.80	4.15	3.98	4.10	3.95	4.03	3.95	4.05	4.00
	General	4.00	4.15	4.08	4.00	4.20	4.10	4.00	4.18	4.09
	Total	3.90	4.15	4.03	4.05	4.08	4.07	3.98	4.12	4.05

*Underlining designates means for the levels within each variable.

TABLE 21

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 4

BY INDEPENDENT VARIABLE CATEGORIES

Did you find that you had to change some of your ideas about what people in those occupations do?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	1.60	1.90	1.75	2.00	1.80	1.90	1.80	1.85	1.83
	General	1.90	2.00	1.95	1.80	1.60	1.70	1.85	1.80	1.83
	Total	1.75	1.95	1.85	1.90	1.70	1.80	1.83	1.83	1.83*
Choice Denied	Specific	1.90	1.90	1.90	1.80	1.50	1.65	1.85	1.70	1.78
	General	1.70	1.90	1.80	1.40	1.70	1.55	1.55	1.80	1.68
	Total	1.80	1.90	1.85	1.60	1.60	1.60	1.70	1.75	1.73
Total	Specific	1.75	1.90	1.83	1.90	1.65	1.78	1.83	1.78	1.81
	General	1.80	1.95	1.88	1.60	1.65	1.63	1.70	1.80	1.75
	Total	1.78	1.93	1.86	1.75	1.65	1.70	1.77	1.79	1.78

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*Underlining designates means for levels within each variable.

preferred indicated that they thought they would be more successful in working at a job than did subjects who were not assigned their first choices. Choice was the only significant main effect shown in the analysis of variance. Means for scores on Item 5 are reported in Table 22.

The interaction between choice and inquiry notification shows that subjects given their first choices but no notice of inquiry were more certain that they could be successful in an occupation than were subjects in any of the other choice-inquiry-notification treatment combinations. Subjects given their first choices and also notified of the inquiry were less certain. Among subjects who were denied their choices, certainty increased for those who were notified, but decreased for those not notified.

The interaction among choice, question specificity and sex appeared very much like the same second order interaction for Item 2. For females, certainty of success was diminished only when specific questions were given to girls denied their choices. For males, certainty of success was increased among boys given general questions and their first choices.

The differences in responses between males and females to question types may have involved differences in their conformity to academic tasks, reading ability and the amount of reading necessary to examine the specific versus the general questions. It should be recalled that the subject sample contained a large proportion of students who demonstrated low verbal abilities. Although the content areas into which the questions inquired were the same for both types of questions, the number and length of questions was greater for the specific items than

TABLE 22

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 5

BY INDEPENDENT VARIABLE CATEGORIES

Are you now more certain than before that you could be successful in an occupation?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	3.10	3.60	3.35	3.60	3.70	3.65	3.35	3.65	3.50
	General	3.60	3.60	3.60	3.90	3.50	3.70	3.75	3.55	3.65
	Total	3.35	3.60	3.48	3.75	3.60	3.68	3.55	3.60	3.58*
Choice Denied	Specific	3.30	3.20	3.25	3.10	3.10	3.10	3.20	3.15	3.18
	General	3.40	3.90	3.65	3.10	3.30	3.20	3.25	3.60	3.43
	Total	3.35	3.55	3.45	3.10	3.20	3.15	3.23	3.38	3.31
Total	Specific	3.20	3.40	3.30	3.35	3.40	3.38	3.28	3.40	3.34
	General	3.50	3.75	3.63	3.50	3.40	3.45	3.50	3.58	3.54
	Total	3.35	3.58	3.47	3.43	3.40	3.42	3.39	3.49	3.44

*Underlining designates means for levels within each variable.

for the general ones. Also the form of the specific questions appeared to demand subject participation or response much in the manner of a classroom academic exercise. Quite conceivably, males, who are generally less adept readers than females, tended not to read the page filled with specific questions, or to reject the question sheet on the basis of its apparent academic demands. The general question sheet, however, required much less reading and the amount or degree of student response was ambiguous. Males, therefore, may have examined the general items more frequently than the specific ones.

Response to different question types was particularly marked among males according to whether or not they received their choices: those receiving general questions and their choices expressing much more certainty of success than those receiving specific questions and their choices. Evidence suggests, therefore, that males denied their first choices and given specific questions declined to conform to the apparent demands of the treatment conditions, and consequently, reacted less positively than did males given their choices in addition to less demanding, general questions.

In contrast, females who received their choices may have tended to conform to the demand characteristics of the specific question sheet, the amount of reading being less of an issue for them than for males.

Student Reaction Sheet Item 6

> Do you now know better what it would feel like to work
> at a particular occupation?

Table 23 contains the cell means for the responses to Item 6. Although none of the research hypotheses was accepted for this criterion measure, trends in the marginal means for each variable about which an

TABLE 23

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 6

BY INDEPENDENT VARIABLE CATEGORIES

Do you now know better what it would feel like to work at a particular occupation?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	3.60	4.40	4.00	4.10	4.60	4.35	3.85	4.50	4.18
	General	4.00	4.10	4.05	3.30	4.10	3.70	3.65	4.10	3.88
	Total	3.80	4.25	4.03	3.70	4.35	4.03	3.75	4.30	4.03*
Choice Denied	Specific	4.10	4.00	4.05	3.80	3.90	3.85	3.95	3.95	3.95
	General	4.00	3.70	3.85	3.50	3.90	3.70	3.75	3.80	3.78
	Total	4.05	3.85	3.95	3.65	3.90	3.78	3.85	3.88	3.87
Total	Specific	3.85	4.20	4.03	3.95	4.25	4.10	3.90	4.23	4.07
	General	4.00	3.90	3.95	3.40	4.00	3.70	3.70	3.95	3.83
	Total	3.93	4.05	3.99	3.68	4.13	3.90	3.80	4.09	3.95

---

*Underlining designates means for the levels within each variable.

hypothesis was posed were in the proper direction. The difference between levels of question specificity approached significance at the .05 level. One main effect, sex, was significant ($p < .025$) and resulted in the rejection of the hypothesis of "no differences" attributable to sex. Females expressed the opinion that following the problem-solving treatments they knew better what it would be like to work at a particular occupation than did males. However, this sex difference was almost entirely due to those females who had been given their first choices. The interaction of the variables, choice and sex, clearly shows that females who received their choices of occupational kits thought that they knew better what working at a job would be like than did females of the "choice denied" group. For males, however, the trend in responses was slightly reversed. Subjects in all treatment groups, recorded an increased estimate of understanding particular jobs in relation to their pre-treatment estimates.

Student Reaction Sheet Item 7

> Do you now know better exactly what would be expected
> of you on a job?

No main effects were significant for responses to this item. Consequently, the main research hypotheses could not be confirmed for Item 7. Table 24 gives the cell means for the item responses.

Trends in the means for choice, inquiry notification, and question specificity are in the direction of the research hypothesis. Two interactions were significant: choice and inquiry notification, and question specificity, inquiry notification and sex. Accurate expectations apparently are promoted by either of two combinations of treatments -- either granting choices and not notifying, or denying choices

TABLE 24

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 7

BY INDEPENDENT VARIABLE CATEGORIES

Do you now know better exactly what would be expected
of you on a job?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	3.60	4.00	3.80	4.40	4.20	4.30	4.00	4.10	4.05
	General	3.90	4.10	4.00	3.80	4.30	4.05	3.85	4.20	4.03
	Total	3.75	4.05	3.90	4.10	4.25	4.18	3.93	4.15	4.04*
Choice Denied	Specific	4.10	4.20	4.15	3.80	3.70	3.75	3.95	3.95	3.95
	General	4.20	4.10	4.15	3.30	4.20	3.75	3.75	4.15	3.95
	Total	4.15	4.15	4.15	3.55	3.95	3.75	3.85	4.05	3.95
Total	Specific	3.85	4.10	3.98	4.10	3.95	4.03	3.98	4.03	4.00
	General	4.05	4.10	4.08	3.55	4.25	3.90	3.80	4.18	3.99
	Total	3.95	4.10	4.03	3.83	4.10	3.97	3.89	4.11	4.00

*Underlining designates means for the levels within each variable.

and notifying. The alternative combinations yield lower self-estimates of future job requirements.

This pattern of interaction has recurred several times in the analysis of Student Reaction Sheet items. It suggests that students who were denied their choices may have reacted to the treatment conditions in much the same manner as they might to classroom assignments. Generally, such assignments are given without choice on the part of the student and he is usually notified that he will be accountable for the informational content of the assignment. When students are not so notified they tend to disregard or pay little attention to the classroom events.

Students who were given their choices and notified of inquiry reacted less favorably than did those not notified. Possibly, awarding students their preferences, but then informing them that they will be asked questions about the materials and their informational acquisitions, removes an element of freedom of action from the student or perhaps curtails some undefined factor in the "choice" variable.

In the three-way interaction of question specificity, inquiry notification and sex, females who received general questions and no notice of later inquiry indicated that they better understood what would be expected of them on a job than did males or females of any other combination of the three variables. Among males the most effective treatment combination was receiving specific questions but no notice of later inquiry. This interaction is inconsistent in part with other significant interactions. For example, on Item 7 males responded more favorably to specific questions than to general ones and females more to general questions than to specific ones. In interactions described earlier trends in responses according to sex were just the opposite for the two question types. With respect to response differences relative to sex and notification of inquiry, the interaction is consistent with trends in other significant interactions.

Student Reaction Sheet Item 8

> Do you feel that you know better now what you yourself would enjoy and be good at in an occupation?

The results of the analysis of variance of the data from Item 8 were quite clear. Choice was a significant main effect at $p < .005$. Subjects who received the problem-solving materials that they preferred indicated that they knew better what they would enjoy and be good at in an occupation than did subjects who did not receive their preferred materials.

No other main effects were significant. Cell means for main effects are given in Table 25.

Sex differences were only slight: females indicating enjoyment and success at work somewhat more than males. Null hypotheses for sex and for the interactions were accepted.

Summary of Results from the Student Reaction Sheet

The analysis of the responses to the Student Reaction Sheet items show several persistent trends, which are perhaps best exemplified in the results of the total score analysis. The results of the total score analysis probably represent the most reliable summarization of a generalized subjective reaction. However, several main effects and interactions for individual items also showed consistencies.

Briefly, the results indicated the following:

TABLE 25

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 8

BY INDEPENDENT VARIABLE CATEGORIES

Do you feel that you know better now what you yourself would enjoy and be good at in an occupation?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	3.40	3.70	3.55	3.90	4.10	4.00	3.65	3.90	3.78
	General	3.60	3.70	3.65	3.50	3.80	3.65	3.55	3.75	3.65
	Total	3.50	3.70	3.60	3.70	3.95	3.83	3.60	3.83	3.72*
Choice Denied	Specific	3.60	3.40	3.50	3.50	2.90	3.20	3.55	3.15	3.35
	General	3.30	3.30	3.30	3.20	3.40	3.30	3.25	3.35	3.30
	Total	3.45	3.35	3.40	3.35	3.15	3.25	3.40	3.25	3.33
Total	Specific	3.50	3.55	3.53	3.70	3.50	3.60	3.60	3.53	3.57
	General	3.45	3.50	3.48	3.35	3.60	3.48	3.40	3.55	3.48
	Total	3.48	3.53	3.51	3.53	3.55	3.54	3.50	3.54	3.52

*Underlining designates means for the levels within each variable.

1. Subjects who received their first choices of occupational problem-solving materials gave overwhelmingly more favorable reactions to the kits and to the estimations of their own success at jobs than did subjects who did not receive their first choices. Because of the randomization procedure, however, this finding will need to be confirmed on the smaller sample of subjects, all of whom were randomly assigned from the same population before this observed difference can be attributed to granting or denying choices.
2. Non-significant trends in the means for the levels within the variables of question specificity and inquiry notification tended to conform to the directional research hypotheses. That is, subjects who received specific questions tended to give slightly more favorable reactions to the kits and to their self-estimates of job success and understanding than did subjects who received general questions. Subjects notified that their reactions would be asked for later responded slightly more favorably than did those who were not so notified.
3. Females consistently responded to the Student Reaction Sheet items more favorably than males. In particular, females indicated significantly more interest in working with additional problem-solving materials and also gave more positive estimates of their job success than did males.

4. Consistent interactions included (a) choice by inquiry notification and (b) choice, question specificity and sex.
    (a) Subjects given their first choices of kits but not notified of later inquiry liked the problem-solving materials more, were more certain of their own future job success, and developed more realistic feelings about work than did subjects given their choices and also informed of later inquiry. Subjects who did not receive their first choices but were notified responded to these content categories more favorably than did those who were denied their choices and were not notified.
    (b) Female subjects who received their preferred materials and were given specific questions expressed more interest in exploring a variety of different occupations and better estimates of their future work success than did females not receiving this combination of treatments. Male subjects who were denied their choices and were given general questions indicated more desire to explore different occupations and gave better estimates of their future work success than did males who were given their choices and received specific questions.
5. Three interactions occurred only once each; two concerned choice and sex, one concerned question specificity, inquiry notification and sex. Even though these interactions found little or even contrary support from other analyses they may serve as sources for future hypotheses.

(a) Males who received their choices of kits wanted to explore different occupations more than did males who were denied their choices. Females denied their choices indicated only slightly more interest in exploring different occupations than did females who received their choices.

(b) Females given their preferences for kits reported that they knew what working at a job would be like more than did females denied their preferences. For males the trend was slightly reversed.

(c) Male subjects who received their choices of kits and were given general questions indicated that they were more certain of succeeding at an occupation than were males or females of the non-choice group, irrespective of question type.

In the analysis of the eight Student Reaction Sheet items and the total score, 99 interactions were computed. Five interactions significant at the .05 level and one at the .01 level would be anticipated by chance. The analyses showed eight significant interactions at the .05 level and one at the .01 level. These occurrences closely approximate those expected by chance. It should be noted, however, that four significant interactions -- two at the .005 level and one each at the 01 and .05 levels -- appeared between choice and inquiry notification. Intercorrelations among the items for which the interactions occurred ranged from .22 to .33.

Vocational Planning Questionnaire

The Vocational Planning Questionnaire contained five items asking the subject to describe the variety of information seeking he entered into during the post-treatment criterion period. Items 1, 3 and 4 were divided into two subitems each. The purposes of the subitems were twofold: (1) to provide some means of estimating the validity of the self-report items by comparing responses on them with behavioral records, and (2) to reduce response tendencies or biases by requiring additional explanations for both "yes" or "no" responses. Data from the subitems was not analyzed but is reported in Appendix I, Subsidiary Data.

Item I was scored by assigning the value of zero to the response category "None," and assigning the values one through seven sequentially to each of the incremented time intervals. Items 2, 3 and 4 were scored on a dichotomous, one-zero basis: one assigned to "Yes," zero to "No." Item 5 was scored by assigning the value of one to the first response alternative and two to the second. The higher scoring values always conformed to the hypothesized directions for the study.

The pattern of analyses for the Vocational Planning Questionnaire is comparable to that of the Student Reaction Sheet. First, an analysis of the total score for Items 1 through 4, scored dichotomously on a "Yes-No" basis, was performed. These four items pertained to the behavioral efforts of the subjects. Second, an individual analysis for each item was performed.

Vocational Planning Questionnaire Total Score (Items 1-4)

Variance analyses for all items appear in Appendix E. Cell means for the total scores, Items 1-4, are given in Table 26. Clearly, the variable of "choice" was a highly significant influence on responses to these items. Subjects who received their choices of occupational problem-solving materials spoke more with other people, requested more information by mail, and read more occupational materials, than did subjects who did not receive their choices.

Vocational Planning Questionnaire Item 1

> During the past seven days how much time have you spent talking about your possible future occupations?

None
1-10 minutes
10-20 minutes
20-30 minutes
30-40 minutes
40-50 minutes
50-60 minutes
More than one hour

The analysis of variance for Item 1 shows no significant main effects or interactions. None of the research hypotheses was accepted for the criterion of how much time individuals reported they spent talking to others about occupations. Trends in the cell means (Table 27) follow the hypothesized directions for choice and question specificity, but no difference was obtained between notified and unnotified subjects. Trends in the means for sex indicated that females coversed somewhat more about occupations than did males.

On the average subjects talked to others about occupations a total of approximately ten to twenty minutes during the criterion period.

Vocational Planning Questionnaire Item 2

> Did you mail the post card requesting information about occupations?

Yes
No

TABLE 26

MEANS FOR SUM OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE

ITEMS 1 - 4 BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	0.90	1.30	1.10	1.30	1.30	1.30	1.10	1.30	1.20
	General	1.20	1.00	1.10	1.00	1.30	1.15	1.10	1.15	1.13
	Total	1.05	1.15	1.10	1.15	1.30	1.23	1.10	1.23	1.17*
Choice Denied	Specific	0.60	0.90	0.75	1.00	0.80	0.90	0.80	0.85	0.83
	General	0.60	0.80	0.70	0.60	0.90	0.75	0.60	0.85	0.73
	Total	0.60	0.85	0.73	0.80	0.85	0.83	0.70	0.85	0.78
Total	Specific	0.75	1.10	0.93	1.15	1.05	1.10	0.95	1.08	1.02
	General	0.90	0.90	0.90	0.80	1.10	0.95	0.85	1.00	0.93
	Total	0.83	1.00	0.92	0.98	1.08	1.03	0.90	1.04	0.98

*Underlining designates means for the levels within each variable.

TABLE 27

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE

ITEM 1 BY INDEPENDENT VARIABLES CATEGORIES

During the past seven days how much time have you spent talking about your possible future occupations?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	1.80	2.00	1.90	1.50	2.50	2.00	1.65	2.25	1.95
	General	2.20	2.80	2.50	1.30	2.90	2.10	1.75	2.85	2.30
	Total	2.00	2.40	2.20	1.40	2.70	2.05	1.70	2.55	2.13*
Choice Denied	Specific	1.30	1.80	1.55	2.50	1.80	2.15	1.90	1.80	1.85
	General	1.10	1.90	1.50	1.00	1.40	1.20	1.05	1.65	1.35
	Total	1.20	1.85	1.53	1.75	1.60	1.68	1.48	1.73	1.60
Total	Specific	1.55	1.90	1.73	2.00	2.15	2.08	1.78	2.03	1.90
	General	1.65	2.35	2.00	1.15	2.15	1.65	1.40	2.25	1.83
	Total	1.60	2.13	1.87	1.58	2.15	1.87	1.58	2.14	1.87

*Underlining designates means for the levels within each variable.

TABLE 28

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE

ITEM 2 BY INDEPENDENT VARIABLE CATEGORIES

Did you mail the post card requesting information about occupations?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	0.00	0.30	0.15	0.20	0.10	0.15	0.10	0.20	0.15
	General	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	Total	0.05	0.20	0.13	0.15	0.10	0.13	0.10	0.15	0.13*
Choice Denied	Specific	0.00	0.00	0.00	0.10	0.00	0.05	0.05	0.00	0.03
	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.05	0.00	0.03	0.03	0.00	0.02
Total	Specific	0.00	0.15	0.08	0.15	0.05	0.10	0.08	0.10	0.09
	General	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Total	0.03	0.10	0.07	0.10	0.05	0.08	0.07	0.08	0.07

---

*Underlining designates means for the levels within each variable.

The analysis of this data closely parallels that of the post card data analysis. Table 28 shows the cell means by each independent variable category.

Choice was again a significant main effect. Subjects who received their choices of occupational treatment materials reported that they mailed post cards for occupational information more than did those subjects who were not given their choices. This outcome was anticipated by the high correlation (phi = .95) between the actual receipt of post cards and the reported mailing of post cards discussed earlier. Generally, the analysis of Item 2 data conforms to that for "post cards received" and will not be discussed in further detail.

Vocational Planning Questionnaire Item 3

> During the past seven days have you written anywhere else for occupational information?
>
> Yes No

No significant main effects or interactions occurred in the Item 3 analyses. Table 29 reports the cell means for responses to the item. Trends in the means show no difference among the levels of the "choice" variable and counters the research hypotheses for question specificity and inquiry notification. The null hypothesis held for "no sex differences," but males reported writing for occupational information slightly more than did females.

Vocational Planning Questionnaire Item 4

> During the past seven days have you read any books or pamphlets about any jobs or about choosing an occupation?
>
> Yes No

TABLE 29

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE

ITEM 3 BY INDEPENDENT VARIABLE CATEGORIES

During the past seven days have you written anywhere else for occupational information?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	0.00	0.00	0.00	0.10	0.10	0.10	0.05	0.05	0.05
	General	0.10	0.00	0.05	0.00	0.10	0.05	0.05	0.05	0.05
	Total	0.05	0.00	0.03	0.05	0.10	0.08	0.05	0.05	0.05*
Choice Denied	Specific	0.00	0.00	0.00	0.10	0.00	0.05	0.05	0.00	0.03
	General	0.10	0.10	0.10	0.10	0.00	0.05	0.10	0.05	0.08
	Total	0.05	0.05	0.05	0.10	0.00	0.05	0.08	0.03	0.06
Total	Specific	0.00	0.00	0.00	0.10	0.05	0.08	0.05	0.03	0.04
	General	1.10	0.05	0.08	0.05	0.05	0.05	0.08	0.05	0.07
	Total	0.05	0.03	0.04	0.08	0.05	0.07	0.07	0.04	0.06

*Underlining designates means for the levels within each variable.

The factor of choice again appeared significantly in the analysis of variance for Item 4. Individuals who received the problem-solving kits they requested significantly ($p < .05$) read more occupational books and pamphlets than did individuals who did not receive their preferred kits. Cell means (Table 30) showed no differences in the relative influences of specific and general orienting questions, but trends in levels of inquiry notification countered the hypothesized direction. The null hypotheses for sex differences was accepted. Females, however, tended to report reading somewhat more about occupations than males did.

Vocational Planning Questionnaire Item 5

> Realistically, when it comes to choosing a job I will
> (Check what you really will do):
>
> > Wait until I'm about ready to start a job and then
> > take the best job I can find.
> >
> > Find out soon what the opportunities are for me in
> > various occupations.

Table 31 contains cell means for this item. Once more, choice was a significant main effect. Those subjects who received the materials they had chosen indicated intentions to look into occupational opportunities earlier than did those who did not receive the kits they had chosen.

One interaction between choice and sex showed that males who received their choices of kits indicated intentions for earlier occupational planning than did males who did not receive their choices. However, females who did not receive their choices reported intentions for earlier planning than did females who received their choices.

Summary of Results, Vocational Planning Questionnaire

One significant main effect, choice, appeared across items. Subjects who were given their choices participated in more occupational

TABLE 30

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE

ITEM 4 BY INDEPENDENT VARIABLE CATEGORIES

During the past seven days have you read any books or pamphlets about any jobs or about choosing an occupation?

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	0.20	0.20	0.20	0.30	0.20	0.25	0.25	0.20	0.23
	General	0.10	0.10	0.10	0.30	0.40	0.35	0.20	0.25	0.23
	Total	0.15	0.15	0.15	0.30	0.30	0.30	0.23	0.23	0.23*
Choice Denied	Specific	0.00	0.10	0.05	0.10	0.20	0.15	0.05	0.15	0.10
	General	0.10	0.20	0.15	0.10	0.00	0.05	0.10	0.10	0.10
	Total	0.05	0.15	0.10	0.10	0.10	0.10	0.08	0.13	0.10
Total	Specific	0.10	0.15	0.13	0.20	0.20	0.20	0.15	0.18	0.17
	General	0.10	0.15	0.13	0.20	0.20	0.20	0.15	0.18	0.17
	Total	0.10	0.15	0.13	0.20	0.20	0.20	0.15	0.18	0.17

*Underlining designates means for the levels within each variable.

TABLE 31

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE

ITEM 5 BY INDEPENDENT VARIABLE CATEGORIES

Realistically, when it comes to choosing a job I will
(Check what you really will do).

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Choice Received	Specific	1.90	1.90	1.90	2.00	1.90	1.95	1.95	1.90	1.93
	General	1.90	1.70	1.80	1.90	2.00	1.95	1.90	1.85	1.88
	Total	1.90	1.80	1.85	1.95	1.95	1.95	1.93	1.88	1.91*
Choice Denied	Specific	1.90	1.80	1.85	1.70	2.00	1.85	1.80	1.90	1.85
	General	1.50	1.80	1.65	1.60	2.00	1.80	1.55	1.90	1.73
	Total	1.70	1.80	1.75	1.65	2.00	1.83	1.68	1.90	1.79
Total	Specific	1.90	1.85	1.88	1.85	1.95	1.90	1.88	1.90	1.89
	General	1.70	1.75	1.73	1.75	2.00	1.88	1.73	1.88	1.81
	Total	1.80	1.80	1.80	1.80	1.98	1.89	1.80	1.89	1.85

*Underlining designates means for the levels within each variable.

information-seeking than did those who were not given their choices. Again, as a consequence of the randomization procedure, this finding requires confirmation from the design in which initial preferences were counterbalanced before this observed difference can be attributed to receiving or not receiving choices.

Non-significant trends in means tended to favor specific over general questions and no notification over notification of inquiry with regard to amount of self-reported information-seeking. Also, females tended to report more information-seeking than males.

Unanalyzed Subsidiary Data

Data collected on the Vocational Planning Questionnaire that was unaligned with the objectives of this experiment was tabulated according to the sex of the subjects and reported in Appendix I. No effort was made to analyze this information, but certain responses were examined in relation to behavioral records as a basis for assessing the general validity of the self-reports.

Intercorrelation of Response Categories

Table 32 displays the Pearson produce-moment correlations among the nineteen response categories of the criterion measures. The criterion measures are parcelled into four areas: behavioral records, achievement tests, Student Reaction Sheet responses, and Vocational Planning Questionnaire responses. Response categories #1 and #2 are the behavioral records; #1 is post card receipts, #2 all other behavioral items. Categories #3 and #4 are the two achievement tests. Categories #5 - #13 are the Student Reaction Sheet total score (#5) and the eight items. The Vocational Planning Questionnaire covers categories #14 - #19: #14

TABLE 32

CORRELATION MATRIX FOR RESPONSES ON ALL CRITERION MEASURES

RESPONSE CATEGORIES	BEHAVIORAL ACHIEVEMENT					STUDENT REACTION SHEET								VOCATIONAL PLANNING QUESTIONNAIRE					
	1. Post Card	2. Others	3. Test I	4. Test II	5. Total	6. Item 1	7. Item 2	8. Item 3	9. Item 4	10. Item 5	11. Item 6	12. Item 7	13. Item 8	14. Total	15. Item 1	16. Item 2	17. Item 3	18. Item 4	19. Item 5
1. Post Card		.46*	.06	-.11	.34*	.18	.03	.18	.16	.16	.24	.13	.32*	.41*	.13	.95*	.06	.10	.04
2. Other Behaviors			.08	-.17	.22	.13	-.14	.08	.06	-.01	.08	.00	.15	.20	.08	.44*	-.03	.18	.07
3. Ach. Test 1				.41*	.11	.07	-.04	.13	.09	.02	.13	.05	-.01	.16	.18	.04	.00	.11	.05
4. Ach. Test 2					-.04	.05	-.10	.06	-.02	.03	-.01	-.08	-.04	-.03	-.05	.07	-.16	.05	.07
5. SRS Total Score						.71*	.38*	.64*	.47*	.54*	.68*	.65*	.57*	.31*	.24	.31*	.03	.12	.20
6. SRS #1, Likes booklets							.26*	.37*	.29*	.22	.38*	.33*	.29*	.28*	.13	.16	.01	.14	.17
7. SRS #2, Explore occup.								.12*	.15	.07	.12	.10	-.04	.07	.05	.05	-.12	-.05	.13
8. SRS #3, Know tasks									.39*	.28*	.45*	.46*	.29*	.15	.11	.13	-.03	.07	.05
9. SRS #4, Change ideas										.09	.25	.36*	.05	.13	.03	.16	-.01	.03	.05
10. SRS #5, Be successful											.38*	.34*	.41*	.13	.15	.14	-.02	.11	.14
11. SRS #6, Feeling of work												.51*	.38*	.21	.14	.23	.05	.01	.16
12. SRS #7, What expected													.29*	.06	-.00	.13	.11	-.02	.11
13. SRS #8, Enjoy occup.														.26*	.33*	.29*	.16	.09	.21
14. VPQ, Total Score															.50*	.42*	.38*	.60*	.17
15. VPQ #1, Discussing jobs																.12	.10	.20	.14
16. VPQ #2, Sent post card																	.05	.08	.05
17. VPQ #3, Wrote for info.																		.05	-.06
18. VPQ #4, Read info.																			.10
19. VPQ #5, Job plans																			

$^*p < .005$

being the total score of the first four items on that questionnaire.

Inspection of the table shows relatively low correlations among response categories, evidence for justifying the individual analyses for items within the four criterion areas. Several important pieces of information appear in this matrix.

1. It is apparent that subjects who responded highly in one category did not necessarily do so in another category. Comparing the behavioral items and the achievement test items shows a negligible relationship between the two. Achievement was not significantly related to use of school informational resources or sending post cards requesting occupational information.
2. High achievement on one test was not significantly related to high achievement on the other. This finding suggests that an uncontrolled influence due to general academic achievement or "test-wiseness" was not operating here.
3. The total score for the Student Reaction Sheet showed relatively high correlations with its sub-items. A correlation coefficient of .35 would be anticipated due to a part-whole effect if true inter-item correlations were zero (Guilford, 1956, p. 327). Correlations between item scores and the total score ranged from .38 to .71.

   For the Vocational Planning Questionnaire the expected part-whole correlation would be .50. Only one item-total score correlation exceeded this value.
4. The high correlation between receipt of post cards, Category #1,

and reported sending of post cards, Category #16, replicated by another method the fourfold point correlation reported earlier.

Experimental Results: Occupational Preferences Counterbalanced

Data obtained on the various criterion measures was analyzed with reference to designs for counterbalancing initial occupational preferences and for counterbalancing occupational problem-solving experiences. The results from the analysis of the two designs were nearly identical. In order to avoid unnecessary repitition only a summary will be presented of the results from the data analyses concerning the counterbalanced initial preference design. Tables of cell means and analysis of variance summaries are provided in Appendix F.

The differences between the two counterbalanced designs pertain only to the "choice" variable for which assignment of subjects to receive or not to receive their choices was based on a randomization scheme stratified by occupational combinations represented in Table 2. For the variables of question specificity and inquiry notification random assignment was performed individually for each subject by the roll of a die. Hence the only differences for these two variables in the two counterbalanced designs occur in the number of subjects per treatment cell: ten in the design counterbalancing occupational experiences and four in that counterbalancing initial preferences. The results concerning sex, question specificity and inquiry notification from the former design have been reported, so these same effects tested on the smaller number of subjects will not be described again.

The results being summarized here are significant main effects for choice and significant interactions involving choice. Significance was considered to be $p < .05$. Subjects who received their first choices

(a) sent more post cards requesting occupational information,

(b) wanted more to work on additional problem-solving kits,

(c) were more certain of their future job success, and

(d) knew better what they would enjoy and be good at in an occupation,

than did subjects who did not receive their choices. Also those who received their choices obtained significantly higher total scores on the Student Reaction Sheet and the Vocational Planning Questionnaire than did those denied their choices. No other differences on criterion measures attained significance levels of .05 or less.

Three first-order interactions involving choice appeared: one between choice and inquiry notification and two between choice and sex. In the first, subjects who received their first choices but were not notified of later inquiry indicated that they planned to look into job opportunities earlier than did subjects who received their choices and were notified. The reverse trend held, however, for subjects denied their choices. This interaction pattern occurred several times in the results from the counterbalanced problem-solving design. Its reappearance here further strengthens evidence that this interaction is not occurring by chance and that constructive information may develop from additional examination of these variables.

In the second interactions between choice and sex, males who received their choices wanted more to work on other kits and planned earlier to look into job opportunities than did males who were denied their choices. Females who received their choices wanted to work with other problem-solving kits more than did females denied their choices, but the choice denied group planned to investigate job opportunities somewhat earlier than the choice received group.

Summary of Results

To this point in the chapter, results have been reported in terms of the data analyses of the individual criterion measures. The questions posed in an experiment, however, are framed in the research hypotheses. In this summary, therefore, results will be organized in relation to each research hypothesis. For the main effects and interactions including choice, only those significant findings which occurred in both design analyses are reported.

> Hypothesis One: Students who are given their first choices of occupational problem-solving materials will respond more positively on criterion measures than students not given their first choices.

On the average, students given their first choices

(a) sent more post cards requesting information,

(b) wanted more to work with other problem-solving kits,

(c) were more confident of their success at an occupation,

(d) gave more positive reactions to the kits, to self-estimates of future job success and to interest in exploring occupations, and

(e) reported more information-seeking activities

than did students denied their choices. Differences on other criteria did not reach the .05 level of statistical significance.

> Hypothesis Two: Students who are given specific questions comparing the merits of the two occupations they study will respond more positively on the criterion measures than will subjects given general questions about occupations.

Students who received specific questions comparing the occupations for which they solved problems achieved higher scores on the occupational information tests than did students given general questions. No other differences attained the .05 level of statistical significance.

> Hypothesis Three: Students who are notified that they will be asked to discuss their reactions and findings following problem-solving will respond more positively on the criterion measures than will subjects who are not notified.

Students given inquiry notification achieved higher scores on the occupational information tests than did subjects not notified. Differences on other criteria were not significant at/or below the .05 level.

The Null Hypothesis for Sex Differences

Females reacted more positively

(a) to the kits and to their future occupational competence,

(b) wanted more to work with additional kits, and

(c) reported knowing better what working would be like, than did males.

The null hypothesis for "no differences attributable to the sex of subjects" was accepted for all other measures.

Interactions

Two significant interactions appeared in both analyses.

(a) Choice and sex. Males who received their choices planned to look into job opportunities earlier than did males who were denied their choices. Females responded in the opposite direction.

(b) Choice and inquiry notification. Subjects given their choices but unnotified of later inquiry reacted more positively toward the kits, had higher self-estimates of job success and better understanding of job demands than did subjects who received their choices and were also notified of the inquiry. For those denied their choices, notification of later inquiry produced more favorable responses than no notification.

CHAPTER IV

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Summary of this Study

Recently, series of studies have been performed to examine methods of stimulating students to explore educational and vocational information and opportunities. One line of research has been directed to the use of "model-reinforcement counseling" and "reinforcement counseling." Doctoral dissertations by Schroeder (1964), Thoresen (1964), Varenhorst (1964) and Hosford (1966) have applied these methods to stimulate information seeking among students as a necessary initial stage in career and educational decision-making. A second line of experimental research has centered about vocational problem-solving. These latter studies were developed in projects by Krumboltz (1967a, 1967b) and described in dissertations by Sheppard (1967) and Jones (1966) who, by presenting students with simulated occupational problems, attempted to examine treatment influences upon occupational information seeking.

Krumboltz' work has been directed toward determining experimentally certain factors that lead to occupational interests. He supervised the development of occupational problem-solving materials, kits which presented to the subject real problems which workers at various occupations solve daily. It was hypothesized that by working on these simulated occupational experiences subjects would find vocational information more meaningful. Furthermore, if they had success at the tasks, they would presumably be inclined to seek information about the occupations for which they solved problems.

The collective purpose of these related investigations has been to study, experimentally,the relative effectiveness of a variety of techniques and procedures developed to assist individuals in their educational and vocational decision-making and to understand better what variables influence the development of their career choices.

The purpose of this study is to examine the effectiveness of particular variables for stimulating occupational information-seeking following the presentation of vocational problem-solving materials. Earlier studies have sought to determine the effectiveness of problem-solving relative to customary forms of descriptive occupational materials for stimulating information seeking. The rationale for the selection of independent variables derived from the concepts of symbolic models by Bandura and Walters (1963) and of orienting stimuli by Berlyne (1960). A symbolic model is a written or oral directive or instruction for guiding the recipient's actions. The actual qualities of such models, however, were undefined by Bandura and Walters.

Recently, Berlyne (1960,1965) has proposed a theory of exploratory behavior in which he discussed orienting stimuli, stimuli which may be used to orient or direct the subject's attention to particular events, objects or conditions in the environment. Berlyne's work has served as a basis for developing and applying the three experimental variables of (1) choice, (2) question specificity and (3) inquiry notification, involved in this study.

The independent variables were represented at two levels or degrees and defined in the following manner in this experiment. "Choice" was applied at dichotomous levels, choice and non-choice, and referred to the subject's receiving or not receiving his first two choices of occupational problem-solving kits according to his preferential ranking of materials during the pre-treatment session. "Question-specificity" concerned the quality of question style comparing the two occupations assigned to the subject for the treatment session. Questions were presented for two possible degrees of specificity: specific, i.e., having only one response that would answer the question, or genera, i.e., having numerous responses that would satisfy the question. "Inquiry notification" was also applied at dichotomous levels: notification and no notification. In the former condition subjects were notified that one week following the final treatment session questions would be asked of them regarding their reactions to the materials and their informational acquisitions regarding the occupation on which the subject worked.

A fourth independent variable, sex of subject was also considered. The dependent variable, occupational information-seeking, was evaluated on the basis of the performance of the subject in three major areas: (1) his use of school and non-school information resources, (2) his informational acquisitions, and (3) his attitudes and reactions to the materials and to occupational preparations.

The three independent variables of choice, question specificity, and inquiry notification were tested in vocational problem-solving settings among eleventh-grade students in a volunteer high school.

Three hypotheses were tested:

1. Students who are given their first choices of occupational problem-solving materials will respond more positively on criterion measures than students not given their first choices.
2. Students who are given specific questions comparing the merits of the two occupations they study will respond more

positively on the criterion measures than will subjects given general questions about occupations.

3. Students who are notified that they will be asked to discuss their reactions and findings following problem solving will respond more positively on the criterion measures than will students who are not notified.

One hundred sixty subjects were given a list of seven occupational kits: accounting, appliance repair, electronic assembly, medical technology, police work, sales work, and X-ray technology. They were asked to indicate the two occupations which they would most wish to try. They were told that it would not be possible for everyone to have his first choices because of the limited number of kits available, but that every student would have an equal chance of receiving his first choices. Eighty students were chosen at random from first-choice pairs endorsed by four or more subjects to receive their two first choices (the "choice received group"). The remaining students were assigned to a group which did not receive their choices (the "choice denied" group). For each student in the choice group who selected a given pair of occupations, a student from the no-choice group received the two identical occupational kits provided that he had not indicated either of them as his first two choices. Matching was also done on the basis of sex. As a consequence of this assignment procedure the distribution of occupational experience (number of booklets for each occupation) was counterbalanced in treatment cells by sex. When eight or more subjects selected the same pair of occupations as their first choices, four of the subjects were randomly assigned to receive their choices and four were randomly assigned not to receive their choices. This procedure counterbalanced the first choices in each treatment cell. The differences between the two counterbalancing procedures were that when the number of booklets for each occupation were the same for each cell, the first choices of the subjects differed somewhat between the choice received and choice denied groups. When the first choices were the same in each treatment cell, the number of booklets for each occupation differed between the choice received and choice denied groups. Data analyses were separate for the two designs.

Half of the choice group and half of the no-choice group received specific detailed questions comparing the two occupations. The other half received general questions. Half of the students who received each type of question were informed that at a specific place and at a specific time one week later they would be asked to describe their reactions to the occupational kits and any information they may have found during the criterion period. In fact, all subjects received such inquiry, but only half of them were told of it in advance.

At the end of the second problem-solving session, all students were given packets of materials which contained a great deal of occupational information relevant to the career they studied. Also in the packets were the orienting questions and a variety of materials the use of which would produce or lead to occupational information.

Any attempts by the subjects to take advantage of opportunities to explore occupational information and demonstration of increased occupational knowledge were considered as evidence of information seeking. The following criterion instruments were used.

1. Amount of information-seeking. Students were presented with a number of standard opportunities to seek further vocational information during the week immediately following the experimental treatment. The following kinds of opportunities were presented to each student in the experiment:

(a) An opportunity to mail a post card requesting occupational information requiring the subject merely to check occupations of interest, affix his own name and address, and mail.

(b) An opportunity to sign up for a special vocational counseling interview.

(c) An opportunity to use career materials available in the school library.

(d) An opportunity to work on other simulated vocational materials.

2. Scores on an achievement test constructed to assess knowledge of the facts relating to the occupations studied.
3. Information given on survey and reaction forms.

Data from the various criterion measures was analyzed by a 2x2x2x2 fixed effects model of an analysis of variance. Separate analysis were performed for the two designs counterbalancing (1) initial occupational preferences and (2) occupational problem-solving experiences.

Conclusions

Hypothesis One: Students who are given their first choices of occupational problem-solving materials will respond more positively on criterion measures than students not given their first choice.

On the average, students given their first choices

(a) sent more post cards requesting information,

(b) wanted more to work with other problem-solving kits,

(c) were more confident of their success at an occupation,

(d) gave more positive reactions to the kits, to self-estimates of future job success and to interest in exploring occupations, and

(c) reported more information-seeking activities than did students denied their choices. Differences on other criteria did not reach the .05 level of statistical significance.

> Hypothesis Two: Students who are given specific questions comparing the merits of the two occupations they study will respond more positively on the criterion measures than will subjects given general questions about occupations.

Students who received specific questions comparing the occupations for which they solved problems achieved higher scores on the occupational information tests than did students given general questions. No other differences attained the .05 level of statistical significance.

> Hypothesis Three: Students who are notified that they will be asked to discuss their reactions and findings following problem-solving will respond more positively on the criterion measures than will subjects who are not notified.

Students given inquiry notification achieved higher scores on the occupational information tests than did subjects not notified. Differences on other criteria were not significant at/or below the .05 level.

The Null Hypothesis for Sex Differences.

Females reacted

(a) more positively to the kits and to their future occupational competence,

(b) wanted more to work with additional kits, and

(c) reported knowing better what working would be like,

than did males.

The null hypothesis for "no differences attributable to the sex of subjects" was accepted for all other measures.

Interactions.

Two significant interactions appeared in both analyses.

(a) Choice and sex. Males who received their choices planned to look into job opportunities earlier than did males who were denied their choices. Females responded in the opposite direction.

(b) Choice and inquiry notification. Subjects given their choices but unnotified of later inquiry reacted more positively toward the kits, had higher self-estimates of job success and better understanding of job demands than did subjects who received their choices and were also notified of the inquiry. For those denied their choices, notification of later inquiry produced more favorable responses than no notification.

Limitations and Implications

This study demonstrated that certain orienting stimuli employed to direct students' efforts toward occupational information resources are effective with respect to certain criterion performances. The results of the experiment warrant these conclusions:

1. Giving students materials concerning occupations of their choice clearly leads to increased and more varied vocational information-seeking, as well as to more self-reports of anticipated job success, than giving them materials about occupations for which their initial preference is low. This finding strongly recurred through the study except in the criterion area of achievement testing; here results were

weak and trends were mixed regarding the influence of choice.

A limitation regarding this conclusion is that students were given only seven occupations from which to make selections. Quite conceivably none of the occupations, when placed in a lengthy list of possible occupational fields, would appear as the first choices of enough students to permit a statistically sound experiment to be performed.

The occupations which students chose were for the majority probably not the occupations they intended for themselves. Evidence for this statement appears in the inquiries in the Vocational Planning Questionnaire in which the students are asked the types of occupational information they would like to have; seldom did any report wanting information about the materials they received -- choice or not.

The magnitude of the results that were obtained under the condition of "limited" choice would probably be increased were it possible to give students materials about any occupations for which they claimed preference.

This overall conclusion regarding choice, however, is dependent upon a summation of the results of the two analyses concerning counterbalanced occupational preferences and counterbalanced occupational experiences. The outcomes of the two analyses are quite similar. The common denominator in these two analyses is the variable of "choice" -- being received or denied. Nevertheless, lacking simultaneous controls over initial preferences and problem-solving experiences leaves in question the effects of choice alone without nested variables of either preference or experience.

The implication of this finding for counselors is that giving a student occupational information or materials pertinent to vocations and careers for which he indicated a preference leads to more interest-indicative activities (i.e., talking with others, reading or writing for occupational information), than giving him non-preferential materials "to expand his view of occupational alternatives."

Possibly merely offering a choice, whether or not the alternatives enter into the realm of the student's actual consideration will promote information-seeking.

2. Giving students specific questions comparing characteristics of occupations for which they received materials and information leads to better achievement on occupational information tests than giving them more general questions. This finding appeared reliably in two testings for information acquired by the students.

The effects of specific questions were particularly noted when subjects were denied the choices of materials. What is unknown yet, however, is the extent to which the amount of reading required and the formats of the two question types influenced differences in performance by sex.

Counselors could utilize this finding to guide the types of questions they might use in their interviews with students seeking vocational guidance.

Rather than pose general questions for the student to consider, about pay for example, a counselor could pose specific questions about exact pay scales of an occupation and have the student compare occupations on this one issue, then select another job feature and repeat the specific comparison, etc. A counselor could also employ specific question lists similar to the one used here, or compose others salient to the student's concerns.

Teachers presenting vocational or career instructional units could also employ this specific type of study question for their students.

3. Giving students foreknowledge or notification that they will be asked questions about information they have collected positively influences their performance on achievement testing.

More importantly, however, notification of inquiry was more influential among students who had been denied their preferences for materials than among those who received their preferences.

In situations that limited the opportunities for students to work with occupational materials of their choice counselors could inform students that they expect to hear what information they (students) have collected between interviews. Instructors could similarly use such methods in the classroom by notifying students that at a definite time they will be asked to report the kinds of information they have acquired about jobs or careers.

4. Performances on the different criterion measures were largely unrelated; students who performed well on the achievement tests were not necessarily the same ones who actively used school or non-school informational resources, or who were most favorably disposed toward the materials.

   Counselors should not use achievement alone, therefore, as an indicator of a student's occupational interests or performance in information-seeking activities. This result strongly suggests that a counselor must define what he will consider to be interest-indicative performance and not generalize beyond evidence in one category of activity to another until data are present to warrant such a generalization.

Certain conclusions and implications can be cited for the theoretical concepts on which this experiment was based.

The difference in influence between social and symbolic models should be further explicated. Bandura and Walters (1963, Chapter 4) present evidence that social modeling is particularly effective in establishing or modifying behaviors, and that other variables, e.g., reinforcement or orienting stimuli such as employed in this study, are effective in influencing the occurrence or the rate of response. The difference in model functioning has considerable relevance to this experiment. It was assumed that the use of school informational resources by the students was a part of their behavioral repertoires. This was not the case, as was apparent in the results of the behavioral criteria analyses. The base rate of mailing post card requests, scheduling interviews with counselors and using the library resources was sufficiently low that except for receipt of post cards, adequate statistical analyses could not be performed and any interpretation regarding the treatment effects was tenuous. On the basis of the model-reinforcement counseling experiments described earlier it would seem desirable first to establish a prescribed level of performance in the various behavioral categories described here, and then apply orienting stimuli in order to test their effects on the rate of responding.

The concepts extracted from Berlyne's works received varying support from this experiment. Choice and specificity of questioning received strong support, thus tending to replicate Berlyne's findings (1954 and 1966) in somewhat more complex conditions. The study further brought forth some evidence that non-choice conditions lead to more variable performances on criterion measures, such as achievement testing, than do choice conditions. Notification of inquiry or testing was influential in improving performance during achievement testing, but did not seem influential in information seeking or expressed interest in repeated occupational problem-solving.

Inquiry notification was deduced from Berlyne's concepts of orienting stimuli, but not examined by him. The influence of inquiry notification on test performances seems reasonable, as discussed earlier, but its influence on other criterion performances may have been enhanced had the notice been presented at the outset of the treatment sessions. Berlyne reported applying orienting stimuli at the beginning of treatments, not at the end.

Also, the content of the notice may have connoted a test would be given and the students may have responded accordingly. Had other content been included or more specific details presented about what the inquiry would demand, then other criterion performances may have been influenced.

Clearly more study is warranted for each of these independent variables. Sufficient evidence was collected in this study, however, to show that in defined criterion areas, different stimuli can be effective in promoting occupational information-seeking and interest-indicative performances among students.

Considerations for Future Research

Subsequent research efforts in the application of orienting stimuli to occupational information-seeking might profit from the following points:

1. Experimental outcomes on the influence of orienting stimuli in the realm of behavioral criteria will undoubtedly be enhanced and more meaningful if the behaviors involved in occupational information-seeking are established or known to be established prior to the study. If such a rate for the use of library facilities, for example, is very low -- as assessed on some standard established by the experimenter -- effort should be made as a pretreatment to insure the possibility of the emission of such performance, perhaps by social modeling techniques. Once the desired behaviors are known to be in the behavioral repertoires of the students, the influence of orienting stimuli and symbolic models can be thoroughly tested with respect to their effect on response occurrence or rate. The practical consequences of this recommendation are apparent. Students cannot be expected to use occupational-information resources of the school or

community if they have not learned how to do so. Potentially effective counseling procedures cannot be assessed accurately using information-seeking as a criterion unless some minimum base rate of this behavior exists.

2. Control and measurement of the use of school informational resources can be difficult; ineffective procedural controls weaken the internal validity of a criterion as assessed by self-reports of performance being compared to behavioral records. In this study distinct loopholes in recording the use of counselors as information sources were suspected. Consequently, information was lost concerning the effects of the treatment variables.

3. Studies involving occupational interests, must control for the variable of sex of subjects. Not only were occupational preferences distinctly different between males and females, performances on each criterion measure either did show or tended to show sex effects.

4. Built into the measures within the study were validating elements; hence certain self-reports could be validated against other behavioral records. This procedure confirmed the veracity of the self-report data and the internal validity of the experiment.

5. Preceding studies in vocational problem-solving have suffered from the loss of subjects for various reasons and the consequent inequality of replications within cells. In this study about seventy-five per cent of the total subject pool was

assigned to treatment conditions, the remainder to alternate roles to be used in the event of absence among first-selected subjects. The surplus of subjects insured equality of replications and less complicated statistical procedures.

6. To date, studies in vocational problem-solving have been performed late in the school year. As a result the length of time available for taking criterion measures has been limited. An extended post-treatment period, perhaps exceeding half of a school term or more, would permit treatment subjects the opportunity to explore more avenues to occupational information. Perhaps, also, an increased variety of behavioral measures could be made in such a time period. For example, changes in course schedules could be noted, as well as participation in customary school occupational education events.

Suggestions for Future Research

Because the present study was an exploration into possible methods of presenting vocational problem-solving to students and guiding their subsequent information acquisition, many factors were not considered or examined. Experimental evidence regarding the effects of orienting stimuli was needed before more detailed study of particular stimuli or variables was warranted. The findings of this experiment lead now to conjectures and suggestions for research to further establish possible roles and certainly the specific characteristics of symbolic models and orienting stimuli tailored for specific purposes or performance criteria.

1. Replication of this study is needed to establish and strengthen

the external validity or generalizability of the results.

2. Further study of the variable,choice, is needed. Continued preparation of problem-solving materials is costly, but were the range of occupations expanded to alleviate or reduce the present "limited"choice available to subjects, the findings regarding the influence of choice might be more realistic than those obtained here. It would be possible to screen a large number of students to find those whose initial preferences, in fact, coincided with the occupations for which materials are available. A replication of this experiment with such subjects would lead to information on the role of choice in an experimental or in a practical setting; perhaps simply making a choice, irrespective of the realism or meaningfulness of that choice outside the treatment situation, is the important factor. Findings on this issue would have considerable consequences for vocational counselors methods for promoting vocational information-seeking.

3. Questions and notices of inquiry were applied following the treatment sessions. Berlyne posed questions prior to treatments. Additional study is needed to determine the optimal time to present the orienting stimuli to produce the greatest amount of information seeking.

4. Foreknowledge had varying influence on performances in each criterion category. Of the three orienting stimuli foreknowledge was the most difficult to control. Subjects who were notified of later testing, for example, could inform

other subjects inadvertently that a test would occur in one week. Investigation of this orienting stimulus might best be instrumented in an individual counseling setting wherein a single person would or would not be questioned, not an entire class.

5. Application of the occupational problem-solving has been booklet-mediated in all but one of this series of studies. Although Jones (1966) performed a film-mediated study, the population of students to which the film was directed was different from that of the booklet-mediated studies. The written, verbal media has been nested in each of these studies to date. The effect of the media by which the vocational problems are conveyed requires examination. One easily developed, economical study would be the preparation of audio tapes parallel to the booklet materials. Students could listen to the tapes, respond to the questions in the booklet, but not contend with the reading skills required by the texts. Experimentation with the media of problem presentation may result in an increase in male subject performance. Males tend rather consistently to be less skilled readers in academic settings. Eliminating the necessity for reading might reduce the differences due to sex of the subjects.

APPENDIX A

PRE-TREATMENT FORMS

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Guidelines for Assistants 331

Pilot Study Orienting Questions

Specific 332

General 333

Occupational Preference Form 334

YOUR SCHEDULE

PERIOD	1	8:00-8:55	RM 43	RM M26
	2	9:01-9:56		
	3	10:03-11:00		
	4	11:06-12:01		
	5	12:07-1:02	Lunch-can use school cafeteria & faculty dining room	
	6	1:08-2:03		
	7	2:09-3:04		

GENERAL COMMENTS:

1. Try to allow 1/2 hour for travel from Stanford and parking time.
2. Materials will have to be distributed according to student name. Teachers will help, but this may take time. Get Ss working as quickly as possible.
3. A school faculty or staff member will be either in the classroom or nearby all the time.
4. If a student does not want to work on the kit, leave it on his desk and encourage him to look at it. Do not try coercing or disciplining him. (No R+) In almost every room there will be both male and female research assistants. If a male student acts up let a female assistant take care of it, vice versa.
5. If questions come up about the kit or answer form, tell the student to look back at the pages he has read to find the answer.
6. Areas of difficulties and questions:
    a. Ss must start with 1st page of booklet and work sequentially page by page. They may pull out answer forms, X-Rays, etc., and ask what to do with them. Instruct them to put these back and read until they know what to do with them.
    b. Ss may start to write in booklets--they should write only on answer forms.
    c. Ss may trade booklets--do not let them. Tell those who attempt to trade that they will have another chance to work on other kits.
    d. Try to keep talking to a minimum to allow the most number of Ss a chance to finish the kits.
    e. Collect materials as soon as S is finished. That includes the answer form. Ss are supposedto have other things to do to fill up extra time.
7. Five minutes before end of period (by school clock) stop all work. Have Ss total their scores. Collect all materials. Be sure to pick up answer forms WITH NAMES ON THEM, meter boxes and test probes.
8. In case of fire-drill, faculty will take over (I hope--otherwise follow students).
9. I'll be wandering between the two rooms if you need me for anything.

Thank you,
Ron

(PILOT STUDY SPECIFIC QUESTIONS)

Write the name of the occupational kit that you worked on in class:

____.

1. How much do workers in this occupation earn each month?

2. How many people are needed in this occupation in the San Francisco Bay Area?

3. How much education or training would a person need in order to get a job in this field?

4. What kind of classes would a person have to take to be trained for such a job?

5. What proportion of the workers in this occupation are women?

6. Name two places you could go to find out about this occupation.

7. Write down three ways (such as pay, hours of work, training) that the occupation you worked with in class is like one of the occupations given below:

    a. secretary
    b. airline stewardess
    c. beautician

8. Write down three ways (such as pay, hours of work, training) that the occupation you worked with in class is different from one of the following occupations:

    a. file clerk
    b. teacher
    c. housekeeper

(PILOT STUDY GENERAL QUESTIONS)

Write the name of the occupational kit that you worked on in class:

____.

Here are some questions for you to think about:

1. How adequate is the pay in this field?

2. How much is the field growing?

3. What kind of education and training are needed for this job?

4. What do employers think about hiring women to work at this occupation compared to men?

5. What information is available about this occupation?

6. How is this occupation like other jobs you can think of?

7. How is it different from other jobs you can think of?

PRINT YOUR
NAME: ____________________

CLASS
PERIOD: 1 2 3 4 5 6 7 (Circle one)

Sex: M F

In the next few days you will be working with some new and different materials about occupations. Kits have been prepared for seven of the occupations requiring the most new employees over the next several years in the San Francisco Bay Area. You will be able to try samples of the work people in these occupations do every day. You will work on two of the kits.

The occupations are:

- ☐ Accounting
- ☐ Appliance repair
- ☐ Electronic technology
- ☐ Medical laboratory technology
- ☐ Police work
- ☐ Sales
- ☐ X-Ray technology

Put a"1" in the box next to the kit you would like most to try. Then, put a "2" next to your second choice, a "3" next to your third choice, and so on until you have rated all seven occupations. The number "7" will be in the box next to your last choice. Each student will have an equal chance to get his first two choices, but because we only have a small number of kits, some students may not get their first choices.

Now, so that we will be able to give the right materials to the right person please be sure you have filled in the information asked for at the top of this page.

Thank you.

APPENDIX B

INFORMATION PACKET MATERIALS

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CONTENTS

This packet is yours to take with you. In it you will find these materials:

1. Information sheets on the occupations you worked with in the two problem-solving kits.
2. Sources of information about many other occupations.
3. A post card for requesting occupational information.
4. An interview request to see your own counselor about vocations.
5. An interview request to see a special vocational counselor.
6. A list of library materials.
7. Questions to help guide your collection of information.

(Obverse)

CAREER INFORMATION
Dr. John D. Krumboltz
School of Education
Stanford University
Stanford
California 94305

(Reverse)

Please send me information about careers checked below:

____Accounting
____Appliance Repair
____Electronic technology
____Medical laboratory technology
____X-Ray technology
____Police work
____Sales

____CAREER OPPORTUNITIES (describing a variety of occupations)

Please Print: Your Name ______________________________

Address ______________________________

____

INTERVIEW REQUEST

DATE______________________

THIS IS A REQUEST THAT ___________________________
COUNSELOR'S NAME

SCHEDULE AN INTERVIEW FOR ________________________
STUDENT'S NAME

I AM IN __________________CLASS DURING_____PERIOD
(Counselor's Office Hour)

AND IN____________________CLASS DURING______PERIOD
(Counselor's Office Hour)

MY BASIC COURSE TEACHER IS ________________________

Your Counselor will schedule an interview and send a counselor's pass to permit you to leave class.

VOCATIONAL INFORMATION

From now until May 4 you may request an interview with a vocational counselor who will be available to talk with students about finding occupational information.

Interviews will be held between May 5-10. To schedule an interview fill out the form on the right and turn it in to the Counseling Office.

INTERVIEW REQUEST

Please schedule an interview for

(NAME ______________________

on (DATE) _____________. I am in (TEACHER)____________ class during ______________ period.

The counselor will send you a pass.

IN YOUR LIBRARY.......

PROBLEM SOLVING KITS

More problem-solving materials are on reserve in the library. There are kits on accounting, medical laboratory technology, X-Ray technology, appliance repair, sales, police work and electronic technology. The kits may be worked with in the library or checked out over night.

RESERVE BOOKS

At the main desk many books and pamphlets on occupations and careers are on reserve. They contain many ideas about finding job information.

CAREER CORNER DISPLAY

New materials about occupations and careers are shown in the "Career Corner" of your library. These materials will be available after May 8, but you can request to look at them now.

TO REQUEST TO SEE ANY OF THE MATERIALS ON DISPLAY fill out the slip stapled to this page and drop it in the box next to the display.

REQUEST FOR MATERIALS

Each piece of material on display in the Career Corner has a number. On this form, mark the number of each item you want to look at when it is available in the school library.

1 2 3 4 5 6 7 8 9 10

PRINT YOUR NAME: ______________________________

(SPECIFIC QUESTIONS)

HERE ARE SOME QUESTIONS TO TRY TO ANSWER
about the occupations you worked with in class.

What two occupations did you work with?
(Write the titles.) #1. ____________________
#2. ____________________

How much does #1 pay a month at the start?
$____________per month.

How much does #2 pay each month at the start?
$____________per month.

Which pays more at the start? ____________________

Which pays more after 5 years.____________________

Name three high school courses you are taking now or have taken that would help you in occupation #1
a. ____________ b. ____________ c.____________

In occupation #2
a. ____________ b. ____________ c. ____________

Which of the two occupations requires more years of education or training, #1 or #2? ____________.

Do you need a license or union membership to work at occupation #1?______

Do you need either of these to work at occupation #2?__________

Does San Mateo College have classes for occupation #1?__________

For occupation #2?__________

Does Foothill College have classes for occupation #1?________

For occupation #2?____________

Does San Jose State College have classes for occupation #1?__________

For occupation #2?__________

Which of the two occupations needs more workers in the San Francisco Bay Area now?______________.

Which will need more workers here in three years?____________

(GENERAL QUESTIONS)

HERE ARE SOME QUESTIONS TO TRY TO ANSWER
about the occupations you worked with in class.

Do these jobs pay enough?

What knowledge do these jobs require?

How could you become trained for these jobs?

What qualifications would a person need to get these jobs?

What is the future for these jobs?

* * *YOU will be asked questions about this occupational material and about other career information you find about jobs that interest you. This survey will take place in class on May 4, one week from today.

We will be interested to know also what you think of the occupational problem-solving kits on which you worked.

APPENDIX C

CRITERION INSTRUMENTS

CONTENTS PAGE

Achievement Tests for:

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    Electronic Technician 352
    Medical Laboratory Technologist 355
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    Salesman 361
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ACCOUNTANT

INFORMATION SURVEY

____

Print print your name above

DIRECTIONS: Place an X over the letter corresponding to the answer you think is correct for each question. The correct answers are in the information packet you received earlier.

1. The junior accountant's work brings him in contact with
   a. office machinery and financial records, but not people.
   b. accountants and other office workers, but not clients.
   c. accountants and clients.
   d. office workers and clients, but not other accountants.

2. Beginning junior accountants generally earn a monthly salary of
   a. $300
   b. $350
   c. $400
   d. $450

3. Supervising accountants earn an annual salary up to
   a. $10,000.
   b. $15,000.
   c. $20,000.
   d. $25,000.

4. A normal work week for a junior accountant is
   a. 30 hours.
   b. 40 hours.
   c. 44 hours.
   d. 48 hours.

5. How much education is required to become an accounting clerk?
   a. high school or less.
   b. 2 years of junior college.
   c. 3 years of college.
   d. 4 or 5 years of college.

6. Which of the above answers (Question #6) is the minimum educational requirement for a junior accountant?
   a. b. c. d.

7. Which of the following high school courses was not mentioned as one important to accountants?
   a. Math.
   b. Typing.
   c. Business.
   d. Science.

8. Training programs in accounting are given at

   a. San Jose State College.
   b. San Mateo College.
   c. San Francisco State College.
   d. Foothill College.

9. Which of the following is true of accounting?

   a. Nearly all accountants are men.
   b. Fewer men are interested in accounting than ever before.
   c. Most accountants are women but increasing numbers of men are entering the occupation.

10. The opportunities for employment of junior accountants today are

    a. doubtful .
    b. poor.
    c. fair.
    d. good.

11. The opportunities for employment of junior accountants in the future is expected to be

    a. doubtful.
    b. poor.
    c. fair.
    d. good.

12. Automation in accounting is expected

    a. to be too far away to concern us.
    b. not to reduce the demand for accountants.
    c. to reduce the need for all accountants.
    d. to reduce the need for experienced accountants.

13. Most junior accountants are employed in

    a. private corporations.
    b. state offices.
    c. private accounting firms.
    d. city and county offices.

14. The person who directs the work of the junior accountant is

    a. the client.
    b. an accountant.
    c. an accounting clerk.
    d. a sales manager.

15. Which of the following was not mentioned as a duty of the junior accountant?

    a. Making inventories.

    b. Posting accounts.

    c. Auditing records.

    d. Seeing that employees are paid.

16. In small accounting firms the opportunities for advancement

    a. do not exist.

    b. are poorer than in a large firm.

    c. are better than in a large firm.

    d. are about the same as in a large firm.

17. Licensing is required of junior accountants in

    a. California and most other states.

    b. most states except California.

    c. California and a few other states.

    d. none of the states.

18. The work of the junior accountant

    a. requires increasing skills to keep up with technical changes.

    b. requires less training because machines are doing much of the work.

    c. generally does not involve technical equipment.

    d. will soon be completely taken over by machines.

19. The best locations to look for accounting jobs are

    a. in farming communities.

    b. growing metropolitan areas.

    c. resort towns.

    d. stable mining and forestry areas.

20. Which of the following library books was mentioned as one in which you could find additional information about accounting?

    a. OCCUPATIONAL OUTLOOK HANDBOOK

    b. CAREER GUIDE

    c. VOCATIONAL PLANNING

    d. OCCUPATIONS IN ACCOUNTING

APPLIANCE REPAIRMAN
INFORMATION SURVEY

Please print your name above

DIRECTIONS: Place an X over the letter corresponding to the answer you think is correct for each question. The correct answers are in the information packet you received earlier.

1. The appliance repairman's work brings him in contact with

   a. electrical and mechanical equipment, but not the public.
   b. shop owners, but not customers.
   c. both shop owners and customers.
   d. other repairmen, but not the public.

2. Beginning apprentices generally earn an hourly wage of

   a. $1.15 - $1.25.
   b. $1.20 - $1.35.
   c. $1.25 - $1.50.
   d. $1.30 - $1.55.

3. Well qualified journeymen may earn an hourly wage up to

   a. $2.75.
   b. $2.95.
   c. $3.37.
   d. $3.52.

4. A normal work week for a repairman is

   a. 30 hours.
   b. 40 hours.
   c. 44 hours.
   d. 48 hours.

5. How much education is required to become an apprentice appliance repairman?

   a. high school or less
   b. 2 years of junior college
   c. 3 years of college
   d. 5 or 6 years of college.

6. Which of the above answers (Question #6) is the minimum educational requirement for a journeyman?

   a. b. c. d.

7. Which of the following high school courses was not mentioned as one important to future appliance repairmen?

   a. Math
   b. Typing
   c. Mechanical drawing
   d. Machine shop

8. Mentioned as having a training program in appliance repair was

   a. San Jose State College. c. Foothill College.

   b. San Jose City College. d. none of these.

9. Which of the following is true of appliance repair?

   a. Nearly all repairmen are men.

   b. Fewer men are interested in appliance repair than ever before.

   c. Most repairmen now are women but increasing numbers of men are entering the occupation.

   d. Men and women are equally represented in the field.

10. The opportunities for employment of appliance repairmen today are

    a. doubtful. c. fair.

    b. poor. d. good.

11. The opportunities for employment of appliance repairmen in the future is expected to be

    a. doubtful. c. fair.

    b. poor. d. good.

12. Automation in appliance repair is expected

    a. to be too far away to concern us.

    b. not to reduce the demand for repairmen.

    c. to reduce the need for all repairmen.

    d. to reduce the need for skilled repairmen.

13. Most appliance repairmen are employed in

    a. small shops.

    b. large repair companies.

    c. large manufacturing companies.

14. In a small repair shop the repairman generally

    a. has more chance for advancement.

    b. specializes.

    c. performs a variety of lab tests.

    d. relies more on electronic equipment.

15. Which of the following was not mentioned as a duty of the repairman?

    a. Keeping work records
    c. Designing electrical circuits.
    b. Splicing electrical wires
    d. Disassembling toasters.

16. In small shops or businesses the opportunities for advancement

    a. do not exist.
    b. are poorer than in a large shop.
    c. are better than in a large shop.
    d. are about the same as in a large shop.

17. Union membership is required of repairmen in

    a. California and other states.
    b. most states except California.
    c. California and a few other states.
    d. a few states, but not California.

18. The work of the appliance repairman

    a. requires increasing skills to keep up with technical changes.
    b. requires less training because machines are doing much of the work.
    c. generally does not involve technical equipment.
    d. will soon be completely taken over by machines.

19. Most appliance repair jobs are available in locations where the population is

    a. not changing.
    b. increasing.
    c. decreasing.

20. Which of the following library books was mentioned as one in which you could find additional information about appliance repair.

    a. OCCUPATIONAL OUTLOOK HANDBOOK
    c. VOCATIONAL PLANNING
    b. CAREER GUIDE
    d. OCCUPATIONS IN APPLIANCE REPAIR

ELECTRONIC TECHNICIAN
INFORMATION SURVEY

____
Please print your name above

DIRECTIONS: Place an X over the letter corresponding to the answer you think is correct for each question. The correct answers are in the information packet you received earlier.

1. The electronic technician's work brings him in contact with

    a. electronic testing equipment and the public.
    b. electrical engineers and other technicians, but rarely customers.
    c. only electronic testing equipment.
    d. only electrical engineers and customers.

2. Apprentices generally earn an hourly wage of about

    a. $1.57
    b. $2.00
    c. $2.50
    d. $2.75

3. Experienced technicians earn an average hourly wage of

    a. $2.00 - $2.25
    b. $2.25 - $3.00
    c. $2.50 - $3.25
    d. $2.75 - $3.50

4. A normal work week for an electronic technician is

    a. 30 hours
    b. 40 hours
    c. 44 hours
    d. 48 hours

5. How much education is required to become an apprentice?

    a. high school or less
    b. 2 years of junior college
    c. 3 years of college
    d. 5 or 6 years of college

6. Which of the following high school courses was not mentioned as one important to future technicians?

    a. Math
    b. Typing
    c. Business
    d. Science

7. Training programs in electronic technology are given at

    a. San Mateo College.
    b. San Jose State College
    c. San Francisco State College.
    d. Foothill College.

8. Which of the following is true of electronic technology?

   a. Nearly all technicians are men.
   b. Fewer men are interested in electronic technology than ever before.
   c. Most technicians now are men but increasing numbers of women are entering the occupation.
   d. Men and women are equally represented in the field.

9. The opportunities for employment of electronic technicians today are

   a. doubtful.
   c. fair.
   b. poor.
   d. good.

10. The opportunities for employment of electronic technicians in the future is expected to be

   a. doubtful.
   c. fair.
   b. poor.
   d. good.

11. Automation in electronic technology is expected to

   a. be too far away to concern us.
   b. increase the demand for technicians.
   c. reduce the need for all technicians.
   d. reduce the need for skilled technicians.

12. Which of the following was not mentioned as a duty of the electronic technician?

   a. Keeping records.
   b. Using ammeters.
   c. Soldering.
   d. Assembling transistor radios.

13. The work of the electronic technician

   a. requires increasing skills to keep up with technical changes.
   b. requires less training because machines are doing much of the work.
   c. generally does not involve technical equipment.
   d. will soon be completely taken over by machines.

14. Electronic technicians work in two major areas:

a. in manufacturing and in sales.
b. in research and development and in field servicing.
c. in manufacturing and in research and development.
d. in manufacturing and in field servicing.

15. The minimum years of age for hiring in electronics technology is

a. 17.
b. 18.
c. 20.
d. 21.

16. Union membership is required in

a. most large companies.
b. all small and large companies.
c. most small companies.
d. none of the electronics field.

17. In electronics technology work on night shifts is

a. rare.
b. seasonal
c. common in all companies.
d. common in small companies.

18. Which of the following is not an important ability for the technician?

a. Good color vision.
b. Good hearing.
c. Good eye-hand coordination.
d. Good manual dexterity.

19. What are two of the major employment areas for electronic technicians in California?

a. San Francisco Bay Area and Sacramento.
b. Los Angeles Area and Sacramento.
c. Los Angeles Area and San Francisco Bay Area.
d. San Diego Area and Sacramento.

20. Which of the following library books was mentioned as one in which you could find additional information about electronic technicians?

a. OCCUPATIONAL OUTLOOK HANDBOOK
b. CAREER GUIDE
c. VOCATIONAL PLANNING
d. OCCUPATIONS IN ELECTRONICS

____
Please Print your name above

MEDICAL LABORATORY TECHNOLOGIST INFORMATION SURVEY

DIRECTIONS: Place an X over the letter corresponding to the answer you think is correct for each question. The correct answers are in the information packet you received earlier.

1. The medical laboratory technologist's work brings him in contact with

   a. microscopes and other lab equipment, but not the public.
   b. doctors and other hospital workers, but not patients.
   c. both doctors and patients.
   d. patients and hospital workers, but not doctors.

2. A lab trainee may earn a monthly salary of

   a. $100 - $200.
   b. $150 - $300.
   c. $200 - $400.
   d. $250 - $500.

3. Beginning medical technologists generally earn monthly salaries of

   a. $240 - $350.
   b. $300 - $425.
   c. $375 - $475.
   d. $475 - $530.

4. Chief technologists may earn a monthly salary up to

   a. $594.
   b. $625.
   c. $740.
   d. $870.

5. A normal work week for a medical technologist is

   a. 30 hours.
   b. 40 hours.
   c. 44 hours.
   d. 28 hours.

6. How much education is needed to become a lab helper or trainee?

   a. High school or less.
   b. Two years of junior college.
   c. Three years of college.
   d. Five or six years of college.

7. Which of the answers in Question #6 is the minimum educational requirements for a licensed medical technologist.

   a. b. c. d.

8. Which of the following high school courses was not mentioned as being important to future lab technologists?

a. Math.	c. Business.
b. Typing.	d. Science.

9. Training programs in medical laboratory technology are given at

a. Foothill College	c. San Francisco State College
b. San Jose State College	d. San Mateo College

10. Which of the following is true of medical lab technology?

   a. Nearly all technologists are men.

   b. Fewer men are interested in lab technology than ever before.

   c. Most technologists are women, but increasing numbers of men are entering the field.

   d. Men and women are equally represented in the field.

11. The opportunities for employment of medical technologists today are

   a. decreasing.

   b. staying constant over the last four years.

   c. increasing.

12. The opportunities for employment of lab technologists the next five to ten years are

   a. poor.

   b. fair.

   c. good.

13. Automation in medical technology is expected

   a. to be too far away to be of concern.

   b. not to reduce the demand for technologists.

   c. to reduce the need for all technologists.

   d. to reduce the need for skilled technologists.

14. Most medical technologists are employed in

a. private laboratories.	c. private research institutes.
b. public health facilities.	d. hospital laboratories.

15. In a small medical lab the technologist generally

    a. needs less training.
    b. specializes.
    c. performs a variety of lab tests.
    d. uses more electronic equipment.

16. Which of the following was not mentioned as a duty of the medical lab technologist?

    a. Taking blood samples.
    c. Writing reports.
    b. Giving first aid.
    d. Performing lab tests.

17. In small clinics or laboratories the opportunities for advancement

    a. do not exist.
    b. are poorer than in large clinics.
    c. are better than in large clinics.
    d. are about the same as in large clinics.

18. Licensing is required of medical laboratory technologists in

    a. California and most other states.
    b. most states except California.
    c. California and a few other states.
    d. a few states, but not California.

19. To perform his job the technologist especially needs

    a. to be tall.
    b. to have good vision.
    c. to be able to lift heavy weights.
    d. to be able to hear well.

20. Which of the following library books was mentioned as having much more information about medical laboratory technology?

    a. Occupational Outlook Handbook.
    b. Career Guide.
    c. Vocational Planning.
    d. Occupations in Health.

POLICE OFFICER
INFORMATION SURVERY

____
Please print your name above

DIRECTIONS: Place an X over the letter corresponding to the answer you think is correct for each question. The correct answers are in the information packet you received earlier.

1. Which of the following was not mentioned as a requirement for being hired for police work?
   a. Being 21 years of age.
   b. Being athletic.
   c. Men weighing at least 140 pounds, women at least 115 pounds.
   d. Men being at least 5 feet 8 inches, women at least 5 feet 3 inches tall.

2. Beginning policemen and deputy sheriffs generally earn a monthly salary of
   a. \$300 - \$425.
   b. \$350 - \$475.
   c. \$375 - \$500.
   d. \$400 - \$575.

3. Patrolmen may earn a monthly salary up to
   a. \$475.
   b. \$500.
   c. \$590.
   d. \$640.

4. A normal work week for a policeman is
   a. 30 hours.
   b. 40 hours.
   c. 44 hours.
   d. 48 hours.

5. How much education is required to become a police officer?
   a. high school or less.
   b. 2 years of junior college.
   c. 3 years of college.
   d. 5 or 6 years of college.

6. Which of the following high school courses was not mentioned as one important to future police workers?
   a. Math
   b. Typing
   c. Business
   d. Science

7. Training programs in police work is given at
   a. San Jose State College.
   b. San Mateo College.
   c. San Francisco State College
   d. Foothill College.

8. Which of the following is true of police work?

   a. Fewer men are interested in police work than ever before.

   b. Most police workers now are men but increasing numbers of women are entering the occupation.

   c. Men and women are equally represented in the field.

9. The opportunities for employment of policemen and deputy sheriffs today are

   a. doubtful.

   b. poor.

   c. fair.

   d. good.

10. The opportunities for employment of policemen and deputy sheriffs in the future is expected to be

    a. doubtful.

    b. poor.

    c. fair.

    d. good.

11. Automation in law enforcement is expected.

    a. to be too far away to concern us.

    b. not to reduce the demand for police workers.

    c. to reduce the need for all police workers.

    d. to reduce the need for older policemen.

12. Most police workers are employed in

    a. city and county departments.

    b. state police agencies.

    c. private security agencies.

    d. military organizations.

13. In a small department the policeman generally

    a. has more change for advancement.

    b. specializes.

    c. performs a variety of jobs.

    d. relies more on electronic equipment.

14. The individaul who directs a city law enforcement department is a

    a. sheriff.

    b. police sergeant.

    c. police chief.

    d. police lieutenant.

15. Which of the persons in Question #14 heads a county law enforcement department.

    a. b. c. d.

16. Which of the following was not mentioned as duty of policemen?

    a. Searching for missing persons or stolen property.
    b. Testifying in court.
    c. Teaching classes.
    d. Writing reports.

17. In small departments the opportunities for advancement

    a. do not exist.
    b. are poorer than in a large department.
    c. are better than in a large department.
    d. Are about the same as in a large department.

18. Written examinations are required of police workers in

    a. California and most other states.
    b. Most states except California.
    c. California and a few other states.
    d. A few states, but not California.

19. The work of the policemen and deputy sheriffs

    a. requires increasing skills to keep up with technical changes.
    b. requires less training because machines are doing much of the work.
    c. generally does not involve technical equipment.
    d. will soon be completely taken over by machines.

20. Which of the following library books was mentioned as one in which you could find additional information about police work?

    a. OCCUPATIONAL OUTLOOK HANDBOOK
    b. CAREER GUIDE
    c. VOCATIONAL PLANNING
    d. OCCUPATIONS IN LAW ENFORCEMENT

SALES
INFORMATION SURVEY

____

Please print your name above

DIRECTIONS: Place an X over the letter corresponding to the answer you think is correct for each question. The correct answers are in the information packet you received earlier.

1. Salesmen were described as the link between the manufacturer or producer and

   a. the salesmanager.

   b. the advertising department.

   c. people who use the product.

   4. the product.

2. Beginning retail sales persons generally earn weekly salaries of

   a. less than $40. c. $75 - $100.

   b. $50 or more. d. $100 or more.

3. Life insurance, real estate, and other salesmen who work on commission generally have annual incomes of

   a. $4000 - $50000. c. $8000 - $14,000.

   b. $5000 - $12,000. d. $10,000 - $35,000.

4. The normal work week of a retail sales person is

   a. 30 hours. c. 44 hours.

   b. 40 hours. d. 48 hours.

5. How much education is required of retail salesmen?

   a. Most employers require salesmen to have 4 years of college.

   b. Most employers require salesmen to have 2 years of college.

   c. Most employers prefer to hire high school graduates.

   d. Most employers do not care about their salesmen's educational background.

6. Which of the above (Question #6) is true of insurance salesmen?

   a. b. c. d.

7. Which of the following high school courses was not mentioned as one important to future salesmen?

   a. Speech. c. General math.

   b. Business. d. Science.

8. Training programs in sales are given at

    a. San Jose State College. c. Foothill College

    b. San Mateo College. d. San Francisco State College

9. Which of the following is true of sales occupations?

    a. The majority of people employed in retail sales work is men.
    b. There are just about equal numbers of men and women employed in real estate sales work.
    c. The majority of people employed in retail sales work is women.
    d. Insurance selling is the only area of sales in which men outnumber women.

10. The employment opportunities for salesmen today are

    a. doubtful. c. fair.

    b. poor. d. good.

11. The employment opportunities for salesmen in the future is expected to be

    a. doubtful. e. fair.

    b. poor. d. good.

12. What effect is automation expected to have on employment opportunities in sales?

    a. No effect.
    b. Some effect on sales clerks but little effect on other kinds of sales work.
    c. Some effect on real estate salesmen but little effect on other kinds of sales work.
    d. Some effect on insurance salesmen but little effect on other kinds of sales work.

13. More than half of the people in sales work

    a. are in retail sales.
    b. are in insurance sales.
    c. are in real estate sales.

14. Which of the following salesmen would generally work longer and less regular hours?

    a. A retail clerk in a large department store.
    b. A salesman working for a salary rather than commission.

14.(continued)

c. An insurance salesman.

d. A retail clerk in a small clothing store.

15. When a salesmanager is promoted, he generally

a. becomes a production manager

b. becomes a vice president in the firm.

c. is given a larger department or area to manage.

d. has nothing to do with sales.

16. Which of the following was not mentioned as a duty of a retail sales person?

a. Ordering merchandise

b. Stocking shelves

c. Writing advertising copy

d. Taking inventory

17. In a small business the opportunities for advancement

a. do not exist.

b. are poorer than in a large business.

c. are better than in a large business.

d. are about the same as in a large business.

18. Which of the following salesmen must be licensed by the state in which they work?

a. Retail salesmen

b. Real estate salesmen

c. Insurance salesmen

d. Wholesale salesmen

19. Highly successful real estate and insurance salesmen may earn annual incomes up to

a. $10,000.

b. $15,000.

c. $20,000.

d. $25,000.

20. Which of the following library books was mentioned as one in which you could find additional information about sales?

a. OCCUPATIONAL OUTLOOK HANDBOOK

b. CAREER GUIDE

c. VOCATIONAL PLANNING

d. OCCUPATIONS IN SALES

MEDICAL X-RAY TECHNICIAN

INFORMATION SURVEY

____

Please Print your name above

DIRECTIONS: Place an X over the letter corresponding to the answer you think is correct for each question. The correct answers are in the information packet you received earlier.

1. The medical X-ray technician's work brings him in contact with

    a. X-ray tubes and other lab equipment, but not people.

    b. doctors and other hospital workers, but not patients.

    c. both doctors and patients.

    d. patients and hospital workers, but not doctors.

2. Beginning X-ray technicians generally earn a monthly salary of

    a. $250 - $275.

    b. $275 - $300.

    c. $300 - $325.

    d. $350 - $425.

3. The starting monthly salary range for experienced, registered technicians is

    a. $300 - $325.

    b. $275 - $300

    c. $350 - $425.

    d. $375 - $475.

4. A normal work week for an X-ray technician is

    a. 30 hours.

    b. 40 hours.

    c. 44 hours.

    d. 48 hours.

5. How much education is required to become an X-ray technician?

    a. high school or less.

    b. 2 years beyond high school.

    c. 3 years of college.

    d. 5 or 6 years of college.

6. In order to use the title "registered technician" a person must

    a. merely complete two years of training.

    b. complete two years of training and pass an examination.

    c. receive a degree from a four-year college.

    d. complete four years of college and pass an examination.

7. Which of the following high school courses was not mentioned as one important to future X-ray technicians?

    a. math

    b. typing

    c. business

    d. biology

8. Training programs in medical X-ray technology are given at

   a. San Jose State College.
   c. Foothill College.
   b. San Mateo College.
   d. San Francisco State College.

9. Which of the following is true of X-ray technology?

   a. Nearly all technologists are men.
   b. Fewer men are interested in X-ray technology than ever before.
   c. Most technicians now are women but increasing numbers of men are entering the occupation.
   d. Men and women are equally represented in the field.

10. The opportunities for employment of X-ray technicians today are

    a. decreasing.
    b. staying constant over the past four years.
    c. increasing.

11. The opportunities for employment of X-ray technicians in the future is expected to be

    a. doubtful.
    c. fair.
    b. poor.
    d. good.

12. Automation in X-ray technology is expected to

    a. be too far away to concern us.
    b. increase the demand for technicians.
    c. reduce the need for all technicians
    d. reduce the need for skilled technicians.

13. The two major areas of work for the medical X-ray technician are

    a. diagnostic and therapeutic.
    c. therapeutic and corrective.
    b. diagnostic and exploratory.
    d. disease and injury.

14. Which of the following is not true of X-ray technicians?

    a. He operates both stationary and mobile X-ray equipment.
    b. he is often called into surgery to radiograph during an operation.
    c. He is able to diagnose disease and recommend treatment.
    d. He may specialize in dental X-ray, chest X-ray, or some other phase of the work.

15. The physician who directs the lab in which the X-ray technician works is a

    a. pathologist.

    b. radiologist.

    c. orthopedist.

    d. dermatologist.

16. Which of the following was not mentioned as a duty of the medical X-ray technician?

    a. preparing developing solutions.

    b. keeping records of services performed for patients.

    c. cleaning and taking care of the X-ray equipment.

    d. giving emergency first aid.

17. In small clinics or laboratories opportunities for advancement

    a. do not exist.

    b. are poorer than in a large clinic.

    c. are better than in a large clinic.

18. Licensing of X-ray technicians is

    a. required in California and most other states.

    b. required in most states except California.

    c. required in California and a few other states.

    d. no required.

19. The work of the X-ray technician

    a. requires increasing skills to keep up with technical changes.

    b. requires less training because machines are doing much of the work.

    c. generally does not involve technical equipment.

    d. will soon be completely taken over by machines.

20. Which of the following library books was mentioned as one in which you could find additional information about medical X-ray technology?

    a. OCCUPATIONAL OUTLOOK HANDBOOK

    b. CAREER GUIDE

    c. VOCATIONAL PLANNING

    d. OCCUPATIONS IN HEALTH

NAME ______________________________

STUDENT REACTION SHEET

The following questions are about the red-covered booklet that you responded to one week ago. Circle the number of the statement that comes closest to your reaction to the booklet you worked on.

1. To what extent would you like to work on another booklet written in the same manner as the ones you worked on one week ago?

    5. I would like to work on a similar booklet very much.
    4. I would like to work on a similar booklet a little.
    3. It doesn't make much difference to me.
    2. I don't think I would like to work on a similar booklet.
    1. I definitely do not want to work on a similar booklet.

2. To what extent would you like to explore a number of different occupations?

    4. I would like to explore many different occupations.
    3. I've narrowed my choice to about three occupations.
    2. I've narrowed my choice to two occupations.
    1. There's only one occupation that I want to find out more about.

3. Do you now know better exactly what people in those occupations do?

    5. Yes, I know much better what people do in a certain occupation?
    4. Yes, a little better.
    3. About the same.
    2. No, a little less.
    1. No, I know much less about what people do in a certain occupation.

4. Did you find that you had to change some of your ideas about what people in those occupations do?

    3. Yes, very much changed some of my ideas.
    2. Yes, a little.
    1. No, not at all.

5. Are you now more certain than before that you could be successful in an occupation?

   5. Yes, much more certain that I could be successful.

   4. Yes, a little more.

   3. About the same.

   2. No, a little less.

   1. No, much less certain now that I could be successful.

6. Do you now know better what it would feel like to work at a particular occupation?

   5. Yes, much better idea of how it would feel to work at a particular job.

   4. Yes, a little better.

   3. About the same.

   2. No, a little less.

   1. No, much less certain than before how it would feel to work at a particular job.

7. Do you now know better exactly what would be expected of you on a job?

   5. Yes, much better idea now of what would be expected of me.

   4. Yes, a little better.

   3. About the same.

   2. No, a little less certain.

   1. No, much less certain than before of what would be expected of me.

8. Do you feel that you know better now what you yourself would enjoy and be good at in an occupation?

   5. Yes, much better idea of what I would enjoy and be good at.

   4. Yes, a little better.

   3. About the same.

   2. No, a little less well.

   1. No, much poorer idea of what I would enjoy and be good at.

NAME ____________________________

VOCATIONAL PLANNING QUESTIONNAIRE

1. During the past seven days how much time have you spent talking about your possible future occupations?

☐ None	☐ 30-40 minutes
☐ 1-10 minutes	☐ 40-50 minutes
☐ 10-20 minutes	☐ 50-60 minutes
☐ 20-30 minutes	☐ More than one hour

1a. If you checked "None," explain what your career plans are:

1b. If you did talk with some persons about possible occupations, check who they were below.

- ☐ My friend(s)
- ☐ My parent(s)
- ☐ My relative(s):
- ☐ My teacher(s):
- ☐ My counselor(s):
- ☐ Other(s):

2. Did you mail the post card requesting information about occupations?

☐ Yes. ☐ No.

3. During the past seven days have you written anywhere else for occupational information?

☐ Yes. ☐ No.

3a. If you answered "No," explain what kind of information you would like to have:

3b. If you answered "Yes," tell what you requested (the kind of information and/or whom you wrote to):

4. During the past seven days have you read any books or pamphlets about any jobs or about choosing an occupation?

☐ Yes. ☐ No.

4a. If you answered "No," tell what kind of books or pamphlets would be most helpful to you:

4b. If you answered "Yes," tell what you can remember about one thing you read:

Its title was something like

I obtained it (Where?)

5. Realistically, when it comes to choosing a job I will (Check what you really will do).

☐ Wait until I'm about ready to start a job and then take the best job I can find.

☐ Find out soon what the opportunities are for me in various occupations.

APPENDIX D

LETTER FROM STANFORD UNIVERSITY

STANFORD UNIVERSITY
STANFORD, CALIFORNIA

SCHOOL OF EDUCATION

May 1967

Dear Student:

Some time ago you returned a post card asking for some occupational information.

We are enclosing a book describing a variety of occupations. We hope this book will be useful to you as you make educational and vocational plans during your next few years of school. You will note that for each occupation there is an address where you can write for further free information.

Thank you for helping us with this project and best wishes for the 1967-68 school year.

Sincerely yours,

John D. Krumboltz
Professor of
Education and Psychology

JDK:ew

APPENDIX E

ANALYSIS OF VARIANCE SUMMARIES FOR
EACH CRITERION MEASURE:
OCCUPATIONAL EXPERIENCES COUNTERBALANCED

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TABLE 33

ANALYSIS OF VARIANCE OF FREQUENCY OF POSTCARD INFORMATION REQUESTS

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.40	1	0.40	6.88*****
B. Quest.Specificity	0.03	1	0.03	0.43
C. Inquiry Notif.	0.00	1	0.00	0.00
D. Sex	0.03	1	0.03	0.43
AB	0.00	1	0.00	0.00
AC	0.03	1	0.03	0.43
AD	0.10	1	0.10	1.72
BC	0.00	1	0.00	0.00
BD	0.03	1	0.03	0.43
CD	0.10	1	0.10	1.72
ABC	0.03	1	0.03	0.43
ABD	0.10	1	0.10	1.72
ACD	0.03	1	0.03	0.43
BCD	0.10	1	0.10	1.72
ABCD	0.03	1	0.03	0.43
Within Replicates	8.40	144	0.06	
Total	9.38	159		

***** $p < .001$

TABLE 34

ANALYSIS OF VARIANCE OF FREQUENCY OF SCHOOL INFORMATIONAL RESOURCES UTILIZATION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.06	1	0.06	1.29
B. Quest.Specificity	0.06	1	0.06	1.29
C. Inquiry Notif.	0.06	1	0.06	1.29
D. Sex	0.06	1	0.06	1.29
AB	0.01	1	0.01	0.14
AC	0.01	1	0.01	0.14
AD	0.01	1	0.01	0.14
BC	0.16	1	0.16	3.59
BD	0.01	1	0.01	0.14
CD	0.01	1	0.01	0.14
ABC	0.06	1	0.06	1.29
ABD	0.01	1	0.01	0.14
ACD	0.01	1	0.01	0.14
BCD	0.06	1	0.06	1.29
ABCD	0.01	1	0.01	0.14
Within Replicates	6.30	144	0.04	
Total	6.84	159		

TABLE 35

ANALYSIS OF VARIANCE OF SCORES ON
OCCUPATIONAL INFORMATION TEST 1

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	37.45	1	37.45	0.36
B. Quest.Specificity	429.91	1	429.91	4.10*
C. Inquiry Notif.	410.66	1	410.66	3.91*
D. Sex	65.22	1	65.22	0.62
AB	452.16	1	452.16	4.31*
AC	70.37	1	70.37	0.67
AD	12.28	1	12.28	0.12
BC	284.70	1	284.70	2.72
BD	163.16	1	163.16	1.56
CD	34.98	1	34.98	0.34
ABC	36.61	1	36.61	0.35
ABD	0.11	1	0.11	0.00
ACD	77.49	1	77.49	0.74
BCD	1.34	1	1.34	0.01
ABCD	105.22	1	105.22	1.00
Within Replicates	15078.17	144	104.71	
Total	17259.82	159		

* $p < .05$

TABLE 36

ANALYSIS OF VARIANCE OF SCORES ON OCCUPATIONAL INFORMATION TEST 2

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	6.38	1	6.38	0.08
B. Quest.Specificity	332.38	1	332.38	3.92*
C. Inquiry Notif.	265.97	1	265.97	3.14
D. Sex	175.08	1	175.08	2.07
AB	361.71	1	361.71	4.27*
AC	10.39	1	10.39	0.12
AD	17.92	1	17.92	0.21
BC	74.13	1	74.13	0.87
BD	81.10	1	81.10	0.96
CD	1.19	1	1.19	0.01
ABC	414.06	1	414.06	4.89*
ABD	102.74	1	102.74	1.21
ACD	14.66	1	14.66	0.17
BCD	87.51	1	87.51	1.03
ABCD	18.33	1	18.33	0.22
Within Replicates	12263.83	144	85.17	
Total	14227.39	159		

* $p < .05$

TABLE 37

ANALYSIS OF VARIANCE OF TOTAL SCORES ON STUDENT REACTION SHEET

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	172.23	1	172.23	12.11*****
B. Quest.Specificity	7.23	1	7.23	0.51
C. Inquiry Notif.	0.10	1	0.10	0.01
D. Sex	90.00	1	90.00	6.33***
AB	1.23	1	1.23	0.09
AC	144.40	1	144.40	10.15****
AD	0.40	1	0.40	0.03
BC	4.90	1	4.90	0.34
BD	8.10	1	8.10	0.57
CD	3.03	1	3.03	0.21
ABC	28.90	1	28.90	2.03
ABD	57.60	1	57.60	4.05*
ACD	7.23	1	7.23	0.51
BCD	34.23	1	34.23	2.41
ABCD	2.02	1	2.02	0.14
Within Replicates	2060.40	144	14.31	
Total	2621.97	159		

* $p \leq .05$

*** $p \leq .025$

**** $p \leq .005$

***** $p \leq .001$

TABLE 38

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 1°

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	18.91	1	18.91	13.39*****
B. Quest. Specificity	0.06	1	0.06	0.04
C. Inquiry Notif.	1.41	1	1.41	1.00
D. Sex	8.56	1	8.56	6.06***
AB	0.31	1	0.31	0.22
AC	10.51	1	10.51	7.44**
AD	1.06	1	1.06	0.75
BC	1.41	1	1.41	1.00
BD	1.81	1	1.81	1.28
CD	0.01	1	0.01	0.00
ABC	2.26	1	2.26	1.60
ABD	2.76	1	2.76	1.95
ACD	3.91	1	3.91	2.77
BCD	1.41	1	1.41	1.00
ABCD	0.76	1	0.76	0.54
Within Replicates	204.10	144	1.42	
Total	259.19	159		

** $p \leq .01$

*** $p \leq .025$

***** $p \leq .001$

°To what extent would you like to work on another booklet written in the same manner as the ones you worked on one week ago?

TABLE 39

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 2[o]

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	2.50	1	2.50	2.40
B. Quest.Specificity	2.50	1	2.50	2.40
C. Inquiry Notif.	1.60	1	1.60	1.54
D. Sex	1.23	1	1.23	1.78
AB	0.23	1	0.23	0.22
AC	1.23	1	1.23	1.78
AD	4.90	1	4.90	4.71*
BC	0.63	1	0.63	0.60
BD	0.10	1	0.10	0.10
CD	0.00	1	0.00	0.00
ABC	1.60	1	1.60	1.54
ABD	4.23	1	4.23	4.06*
ACD	1.23	1	1.23	1.78
BCD	0.63	1	0.63	0.60
ABCD	0.00	1	0.00	0.00
Within Replicates	149.80	144	1.04	
Total	172.38	159		

* $p \leq .05$

[o] To what extent would you like to explore a number of different occupations?

TABLE 40

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 3[o]

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	1.41	1	1.41	3.15
B. Quest.Specificity	0.31	1	0.31	0.69
C. Inquiry Notif.	0.06	1	0.06	0.13
D. Sex	0.76	1	0.76	1.69
AB	0.31	1	0.31	0.69
AC	0.76	1	0.76	1.69
AD	0.06	1	0.06	0.13
BC	0.01	1	0.01	0.01
BD	0.06	1	0.06	0.13
CD	0.51	1	0.51	1.13
ABC	0.51	1	0.51	1.13
ABD	0.16	1	0.16	0.35
ACD	0.31	1	0.31	0.69
BCD	0.76	1	0.76	1.69
ABCD	0.06	1	0.06	0.13
Within Replicates	64.70	144	0.45	
Total	70.69	159		

[o] Do you now know better exactly what people in those occupations do?

TABLE 41

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 4[c]

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.40	1	0.40	1.48
B. Quest.Specificity	0.10	1	0.10	0.37
C. Inquiry Notif.	0.90	1	0.90	3.33
D. Sex	0.03	1	0.03	0.09
AB	0.10	1	0.10	0.37
AC	0.40	1	0.40	1.48
AD	0.03	1	0.03	0.09
BC	0.40	1	0.40	1.48
BD	0.23	1	0.23	0.83
CD	0.63	1	0.63	2.31
ABC	0.40	1	0.40	1.48
ABD	0.63	1	0.63	2.31
ACD	0.23	1	0.23	0.83
BCD	0.23	1	0.23	0.83
ABCD	0.02	1	0.02	0.09
Within Replicates	39.20	144	0.27	
Total	43.90	159		

[c] Did you find that you had to change some of your ideas about what people in those occupations do?

TABLE 42

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 5°

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	3.03	1	3.03	5.94***
B. Quest.Specificity	1.60	1	1.60	3.14
C. Inquiry Notif.	0.10	1	0.10	0.20
D. Sex	0.40	1	0.40	0.78
AB	0.10	1	0.10	0.20
AC	2.50	1	2.50	4.91*
AD	0.10	1	0.10	0.20
BC	0.63	1	0.63	1.23
BD	0.03	1	0.03	0.05
CD	0.63	1	0.63	1.23
ABC	0.03	1	0.03	0.05
ABD	2.03	1	2.03	3.97*
ACD	0.23	1	0.23	0.44
BCD	0.10	1	0.10	0.20
ABCD	0.10	1	0.10	0.20
Within Replicates	73.80	144	0.51	
Total	85.36	159		

* $p < .05$

*** $p \leq .025$

° Are you now more certain than before that you could be successful in an occupation?

TABLE 43

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 6 ^{o}

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	1.06	1	1.06	1.65
B. Quest.Specificity	2.26	1	2.26	3.52
C. Inquiry Notif.	0.31	1	0.31	0.48
D. Sex	3.31	1	3.31	5.15***
AB	0.16	1	0.16	0.24
AC	0.31	1	0.31	0.48
AD	2.76	1	2.76	4.29*
BC	1.06	1	1.06	1.65
BD	0.06	1	0.06	0.09
CD	1.06	1	1.06	1.65
ABC	1.41	1	1.41	2.19
ABD	0.16	1	0.16	0.24
ACD	0.16	1	0.16	0.24
BCD	1.41	1	1.41	2.19
ABCD	0.16	1	0.16	0.24
Within Replicates	92.90	144	0.65	
Total	108.49	159		

* $p \leq .05$

*** $p \leq .025$

^{o}Do you now know better what it would feel like to work at a particular occupation?

TABLE 44

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 7°

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.31	1	0.31	0.55
B. Quest.Specificity	0.01	1	0.01	0.01
C. Inquiry Notif.	0.16	1	0.16	0.28
D. Sex	1.81	1	1.81	3.26
AB	0.01	1	0.01	0.01
AC	4.56	1	4.56	9.22****
AD	0.01	1	0.01	0.01
BC	0.51	1	0.51	0.91
BD	1.06	1	1.06	1.91
CD	0.16	1	0.16	0.28
ABC	0.51	1	0.51	0.91
ABD	0.06	1	0.06	0.10
ACD	0.76	1	0.76	1.36
BCD	2.76	1	2.76	4.97*
ABCD	0.06	1	0.06	0.10
Within Replicates	80.30	144	0.56	
Total	92.99	159		

* $p < .05$

**** $p < .005$

°Do you now know better exactly what would be expected of you on a job?

TABLE 45

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 8°

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	6.01	1	6.01	7.82 ****
B. Quest.Specificity	0.31	1	0.31	0.40
C. Inquiry Notif.	0.06	1	0.06	0.07
D. Sex	0.06	1	0.06	0.07
AB	0.06	1	0.06	0.07
AC	1.41	1	1.41	1.83
AD	1.41	1	1.41	1.83
BC	0.06	1	0.06	0.07
BD	0.51	1	0.51	0.66
CD	0.01	1	0.01	0.01
ABC	1.41	1	1.41	1.83
ABD	0.76	1	0.76	0.98
ACD	0.06	1	0.06	0.07
BCD	0.51	1	0.51	0.66
ABCD	0.06	1	0.06	0.07
Within Replicates	111.30	144	0.77	
Total	123.94	159		

**** $p \leq .005$

°Do you feel that you know better now what you yourself would enjoy and be good at in an occupation?

TABLE 46

ANALYSIS OF VARIANCE OF SUM OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE FOR ITEMS 1-4

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	6.01	1	6.01	10.47 *****
B. Quest.Specificity	0.31	1	0.31	0.53
C. Inquiry Notif.	0.51	1	0.51	0.88
D. Sex	0.76	1	0.76	1.32
AB	0.01	1	0.01	0.01
AC	0.01	1	0.01	0.01
AD	0.01	1	0.01	0.01
BC	0.16	1	0.16	0.27
BD	0.01	1	0.01	0.01
CD	0.06	1	0.06	0.10
ABC	0.01	1	0.01	0.01
ABD	0.31	1	0.31	0.53
ACD	0.16	1	0.16	0.27
BCD	1.41	1	1.41	2.45
ABCD	0.06	1	0.06	0.10
Within Replicates	83.10	144	0.58	
Total	92.84	159		

***** $p \leq .001$

TABLE 47

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 1°

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	11.03	1	11.03	2.60
B. Quest.Specificity	0.23	1	0.23	0.05
C. Inquiry Notif.	0.00	1	0.00	0.00
D. Sex	12.10	1	12.10	2.85
AB	7.23	1	7.23	1.70
AC	0.90	1	0.90	0.21
AD	3.60	1	3.60	0.85
BC	4.90	1	4.90	1.16
BD	3.60	1	3.60	0.85
CD	0.03	1	0.03	0.01
ABC	0.40	1	0.40	0.09
ABD	0.10	1	0.10	0.02
ACD	7.23	1	7.23	1.70
BCD	0.63	1	0.63	0.15
ABCD	0.22	1	0.22	0.05
Within Replicates	614.80	144	4.27	
Total	666.97	159		

°During the past seven days how much time have you spent talking about your possible future occupations?

TABLE 48

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 2[o]

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.51	1	0.51	8.02****
B. Quest.Specificity	0.06	1	0.06	0.89
C. Inquiry Notif.	0.01	1	0.01	0.10
D. Sex	0.01	1	0.01	0.10
AB	0.01	1	0.01	0.10
AC	0.01	1	0.01	0.10
AD	0.06	1	0.06	0.89
BC	0.01	1	0.01	0.10
BD	0.01	1	0.01	0.10
CD	0.16	1	0.16	2.47
ABC	0.01	1	0.01	0.10
ABD	0.06	1	0.06	0.89
ACD	0.06	1	0.06	0.89
BCD	0.16	1	0.16	2.47
ABCD	0.06	1	0.06	0.89
Within Replicates	9.10	144	0.06	
Total	10.24	159		

**** $p \leq .005$

[o] Did you mail the post card requesting information about occupations?

TABLE 49

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 3[c]

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.00	1	0.00	0.00
B. Quest.Specificity	0.03	1	0.03	0.50
C. Inquiry Notif.	0.03	1	0.03	0.50
D. Sex	0.03	1	0.03	0.50
AB	0.03	1	0.03	0.50
AC	0.03	1	0.03	0.50
AD	0.03	1	0.03	0.50
BC	0.10	1	0.10	2.01
BD	0.00	1	0.00	0.00
CD	0.00	1	0.00	0.00
ABC	0.00	1	0.00	0.00
ABD	0.00	1	0.00	0.00
ACD	0.10	1	0.10	2.01
BCD	0.03	1	0.03	0.50
ABCD	0.03	1	0.03	0.50
Within Replicates	7.20	144	0.05	
Total	7.60	159		

[c] During the past seven days have you written anywhere else for occupational information?

TABLE 50

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 4°

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.63	1	0.63	4.51 *
B. Quest.Specificity	0.00	1	0.00	0.00
C. Inquiry Notif.	0.23	1	0.23	1.62
D. Sex	0.03	1	0.03	0.18
AB	0.00	1	0.00	0.00
AC	0.23	1	0.23	1.62
AD	0.03	1	0.03	0.18
BC	0.00	1	0.00	0.00
BD	0.00	1	0.00	0.00
CD	0.03	1	0.03	0.18
ABC	0.40	1	0.40	2.89
ABD	0.10	1	0.10	0.72
ACD	0.03	1	0.03	0.18
BCD	0.00	1	0.00	0.00
ABCD	0.10	1	0.10	0.72
Within Replicates	20.00	144	0.14	
Total	21.77	159		

* $p \leq .05$

°During the past seven days have you read any books or pamphlets about any jobs or about choosing an occupation?

TABLE 51

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 5°

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.51	1	0.51	4.08*
B. Quest.Specificity	0.31	1	0.31	2.47
C. Inquiry Notif.	0.31	1	0.31	2.47
D. Sex	0.31	1	0.31	2.47
AB	0.06	1	0.06	0.45
AC	0.01	1	0.01	0.05
AD	0.76	1	0.76	6.09***
BC	0.16	1	0.16	1.26
BD	0.16	1	0.16	1.26
CD	0.31	1	0.31	2.47
ABC	0.01	1	0.01	0.05
ABD	0.16	1	0.16	1.26
ACD	0.06	1	0.06	0.45
BCD	0.01	1	0.01	0.05
ABCD	0.31	1	0.31	2.47
Within Replicates	17.70	144	0.12	
Total	21.09	159		

* $p \leq .05$

*** $p \leq .025$

°Realistically, when it comes to choosing a job I will (Check what you really will do.

APPENDIX F

CELL MEANS AND ANALYSIS OF VARIANCE SUMMARIES FOR EACH CRITERION MEASURE:

OCCUPATIONAL PREFERENCES COUNTERBALANCED

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TABLE 52

ANALYSIS OF VARIANCE OF FREQUENCY OF POST CARD RECEIPTS

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.39	1	0.39	5.00 *
B. Question Specificity	0.02	1	0.02	0.20
C. Inquiry Notification	0.02	1	0.02	0.20
D. Sex	0.02	1	0.02	0.20
AB	0.02	1	0.02	0.20
AC	0.02	1	0.02	0.20
AD	0.02	1	0.02	0.20
BC	0.14	1	0.14	1.80
BD	0.02	1	0.02	0.20
CD	0.02	1	0.02	0.20
ABC	0.14	1	0.14	1.80
ABD	0.02	1	0.02	0.20
ACD	0.02	1	0.02	0.20
BCD	0.02	1	0.02	0.20
ABCD	0.02	1	0.02	0.20
Within Replicates	3.75	48	0.08	
Total	4.61	63		

* $p. \leq .05$

TABLE 53

MEANS FOR POST CARDS RECEIVED

BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	0.00	0.00	0.00	0.25	0.25	0.25	0.13	0.13	0.13
	General	0.25	0.25	0.25	0.25	0.00	0.13	0.25	0.13	0.19
	Total	0.13	0.13	0.13	0.25	0.13	0.19	0.19	0.13	0.16 *
CHOICE DENIED	Specific	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	SPECIFIC	0.00	0.00	0.00	0.13	0.13	0.13	0.07	0.07	0.07
	GENERAL	0.13	0.13	0.13	0.13	0.00	0.07	0.13	0.07	0.10
	TOTAL	0.07	0.07	0.07	0.13	0.07	0.10	0.10	0.07	0.09

* Underlining designates means for the levels within each variable.

TABLE 54

ANALYSIS OF VARIANCE OF FREQUENCY OF SCHOOL INFORMATION RESOURCES UTILIZATION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	0.02	1	0.02	1.00
B. Question Specificity	0.02	1	0.02	1.00
C. Inquiry Notification	0.02	1	0.02	1.00
D. Sex	0.02	1	0.02	1.00
AB	0.02	1	0.02	1.00
AC	0.02	1	0.02	1.00
AD	0.02	1	0.02	1.00
BC	0.02	1	0.02	1.00
BD	0.02	1	0.02	1.00
CD	0.02	1	0.02	1.00
ABC	0.02	1	0.02	1.00
ABD	0.02	1	0.02	1.00
ACD	0.02	1	0.02	1.00
BCD	0.02	1	0.02	1.00
ABCD	0.02	1	0.02	1.00
Within Replicates	0.75	48	0.02	
Total	0.98	63		

TABLE 55

MEANS FOR SCHOOL INFORMATIONAL RESOURCES UTILIZATION BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	General	0.00	0.00	0.00	0.25	0.00	0.13	0.13	0.00	0.07
	Total	0.00	0.00	0.00	0.13	0.00	0.07	0.07	0.00	0.04 *
CHOICE DENIED	Specific	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	SPECIFIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GENERAL	0.00	0.00	0.00	0.13	0.00	0.07	0.07	0.00	0.04
	TOTAL	0.00	0.00	0.00	0.07	0.00	0.04	0.04	0.00	0.02

*Underlining designates means for the levels within each variable.

TABLE 56

ANALYSIS OF VARIANCE OF SCORES ON OCCUPATIONAL INFORMATION TEST 1

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	1.59	1	1.59	0.02
B. Question Specificity	55.81	1	55.81	0.77
C. Inquiry Notification	247.47	1	247.47	3.43
D. Sex	112.49	1	112.49	1.56
AB	10.26	1	10.26	0.14
AC	45.61	1	45.61	0.63
AD	55.78	1	55.78	0.77
BC	7.36	1	7.36	0.10
BD	40.43	1	40.43	0.56
CD	29.88	1	29.88	0.41
ABC	42.98	1	42.98	0.60
ABD	2.63	1	2.63	0.04
ACD	13.15	1	13.15	0.18
BCD	74.20	1	74.20	1.03
ABCD	0.00	1	0.00	0.00
Within Replicates	3453.87	48	71.96	
Total	4193.54	64		

TABLE 57

MEANS FOR SCORES ON OCCUPATIONAL INFORMATION TEST 1

BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	52.10	54.55	53.33	55.23	48.85	52.04	53.67	51.70	52.69
	General	52.96	53.49	53.23	49.88	50.15	50.02	51.42	51.82	51.62
	Total	52.53	54.02	53.28	52.56	49.50	51.03	52.55	51.76	52.16 *
CHOICE DENIED	Specific	59.72	55.83	57.78	54.40	45.26	49.83	57.06	50.55	53.81
	General	54.90	50.67	52.78	49.89	49.07	49.48	52.40	49.87	51.13
	Total	57.31	53.25	55.28	52.15	47.17	49.66	54.73	50.21	52.47
TOTAL	SPECIFIC	55.91	55.19	55.56	54.82	47.06	50.94	55.37	51.13	53.25
	GENERAL	53.93	52.08	53.01	49.89	49.61	49.75	51.91	50.85	51.38
	TOTAL	54.92	53.64	54.28	52.36	48.34	50.35	53.64	50.99	52.32

* Underlining designates means for the levels within each variable.

TABLE 58

ANALYSIS OF VARIANCE OF SCORES ON OCCUPATIONAL INFORMATION TEST 2

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	34.31	1	34.31	0.29
B. Question Specificity	140.96	1	140.96	1.19
C. Inquiry Notification	615.78	1	615.78	5.19 *
D. Sex	0.01	1	0.01	0.00
AB	21.97	1	21.97	0.19
AC	112.47	1	112.47	0.95
AD	18.06	1	18.06	0.15
BC	26.63	1	26.63	0.22
BD	27.09	1	27.09	0.23
CD	14.30	1	14.30	0.12
ABC	87.18	1	84.18	0.71
ABD	72.08	1	72.08	0.61
ACD	14.42	1	14.42	0.12
BCD	28.76	1	28.76	0.24
ABCD	44.99	1	44.99	0.38
Within Replicates	5687.25	48	118.48	
Total	6943.26	63		

* $p. \leq .05$

TABLE 59

MEANS FOR SCORES ON OCCUPATIONAL INFORMATION TEST 2

BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	56.14	50.12	53.13	52.03	49.13	50.58	54.09	49.63	51.86
	General	52.26	52.41	52.33	45.47	50.09	47.78	48.87	51.25	50.06
	Total	54.20	51.27	52.73	48.75	49.61	49.18	51.48	50.44	50.96 *
CHOICE DENIED	Specific	58.33	57.23	57.68	42.88	47.80	45.34	50.61	52.52	51.57
	General	48.41	51.70	50.06	46.16	43.41	44.79	47.29	47.56	47.43
	Total	53.37	54.47	53.81	44.52	45.61	45.07	48.95	50.04	49.50
TOTAL	SPECIFIC	57.24	53.68	55.41	47.46	48.47	47.96	52.35	51.08	51.72
	GENERAL	50.34	52.06	51.20	45.82	46.75	46.29	48.08	49.41	48.75
	TOTAL	53.79	52.87	53.31	46.64	47.61	47.13	50.22	50.25	50.23

*** Underlining designates means for the levels within each variable.**

TABLE 60

ANALYSIS OF VARIANCE OF TOTAL SCORES ON

STUDENT REACTION SHEET

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
A. Choice	76.56	1	76.56	5.60 *
B. Question Specificity	9.00	1	9.00	0.66
C. Inquiry Notification	2.25	1	2.25	0.16
D. Sex	3.06	1	3.06	0.22
AB	12.25	1	12.25	0.90
AC	42.25	1	42.25	3.09
AD	5.06	1	5.06	0.37
BC	27.56	1	27.56	2.02
BD	2.25	1	2.25	0.16
CD	1.00	1	1.00	0.07
ABC	7.56	1	7.56	0.55
ABD	16.00	1	16.00	1.17
ACD	1.00	1	1.00	0.07
BCD	0.06	1	0.06	0.00
ABCD	5.06	1	5.06	0.37
Within Replicates	656.50	48	13.68	
Total	867.44	63		

* $p. \leq .05$

TABLE 61

MEANS FOR TOTAL SCORE ON STUDENT REACTION SHEET
BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	26.75	27.75	27.25	30.50	30.50	30.50	28.63	29.13	28.88
	General	31.50	30.25	30.88	30.25	30.00	30.13	30.88	30.13	30.41
	Total	29.13	29.00	29.07	30.38	30.25	30.39	29.76	29.63	29.69 *
CHOICE DENIED	Specific	29.00	27.50	28.25	26.50	27.25	26.88	27.75	27.38	27.57
	General	27.50	30.00	28.75	25.00	27.25	26.13	26.25	28.63	27.44
	Total	28.25	28.75	28.50	25.75	27.25	26.50	27.00	28.00	27.50
TOTAL	SPECIFIC	27.88	27.63	27.75	28.50	28.88	28.69	28.19	28.26	28.24
	GENERAL	29.50	30.13	29.82	27.63	28.63	28.13	28.57	29.38	28.98
	TOTAL	28.69	28.88	28.79	28.02	28.79	28.41	28.38	28.82	28.60

* Underlining designates means for the levels within each variable.

TABLE 62

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 1 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	7.56	1	7.56	5.42 *
B. Question Specificity	0.00	1	0.00	0.00
C. Inquiry Notification	1.56	1	1.56	1.12
D. Sex	2.25	1	2.25	1.61
AB	2.25	1	2.25	1.61
AC	3.06	1	3.06	2.19
AD	6.25	1	6.25	4.48 *
BC	0.25	1	0.25	0.18
BD	0.56	1	0.56	0.40
CD	0.25	1	0.25	0.18
ABC	0.25	1	0.25	0.18
ABD	0.56	1	0.56	0.40
ACD	4.00	1	4.00	2.87
BCD	0.56	1	0.56	0.40
ABCD	0.06	1	0.06	0.04
Within Replicates	67.00	48	1.40	
Total	96.44	63		

* $p. \leq .05$

° To what extent would you like to work on another booklet written in the same manner as the ones you worked on one week ago?

TABLE 63

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 1

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	4.00	3.25	3.63	4.25	4.50	4.38	4.13	3.88	4.01
	General	4.50	3.50	4.00	4.50	5.00	4.75	4.50	4.25	4.38
	Total	4.25	3.38	3.82	4.38	4.75	4.57	4.32	4.07	4.20 *
CHOICE DENIED	Specific	3.25	4.50	3.88	3.50	3.50	3.50	3.38	4.00	3.69
	General	2.50	4.00	3.25	2.75	4.00	3.38	2.63	4.00	3.32
	Total	2.88	4.25	3.57	3.13	3.75	3.44	3.01	4.00	3.51
TOTAL	SPECIFIC	3.63	3.88	3.76	3.88	4.00	3.94	3.76	3.94	3.85
	GENERAL	3.50	3.75	3.63	3.63	4.50	4.07	3.57	4.13	3.85
	TOTAL	3.57	3.82	3.70	3.76	4.25	4.01	3.67	4.04	3.85

* Underlining designates means for the levels within each variable.

° To what extent would you like to work on another booklet written in the same manner as the ones you worked on one week ago?

TABLE 64

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 2 BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	2.75	2.50	2.63	3.25	3.50	3.38	3.00	3.00	3.00
	General	4.00	3.50	3.75	3.25	3.50	3.38	3.63	3.50	3.57
	Total	3.38	3.00	3.19	3.25	3.50	3.38	3.32	3.25	3.28 *
CHOICE DENIED	Specific	3.50	2.75	3.13	3.25	3.25	3.25	3.38	3.00	3.19
	General	3.75	3.50	3.63	4.00	2.75	3.38	3.88	3.13	3.46
	Total	3.63	3.13	3.38	3.64	3.00	3.32	3.64	3.07	3.33
TOTAL	SPECIFIC	3.13	2.63	2.88	3.25	3.38	3.32	3.19	3.00	3.10
	GENERAL	3.88	3.50	3.69	3.63	3.13	3.38	3.76	3.32	3.54
	TOTAL	3.51	3.07	3.29	3.45	3.26	3.35	3.48	3.16	3.32

* Underlining designates means for the levels within each variable.

° To what extent would you like to explore a number of different occupations?

TABLE 65

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 2 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	0.06	1	0.06	0.06
B. Question Specificity	3.06	1	3.06	3.06
C. Inquiry Notification	0.06	1	0.06	0.06
D. Sex	1.56	1	1.56	1.56
AB	0.25	1	0.25	0.25
AC	0.25	1	0.25	0.25
AD	1.00	1	1.00	1.00
BC	2.25	1	2.25	2.25
BD	0.25	1	0.25	0.25
CD	0.25	1	0.25	0.25
ABC	0.56	1	0.56	0.56
ABD	0.06	1	0.06	0.06
ACD	0.56	1	0.56	0.56
BCD	0.56	1	0.56	0.56
ABCD	1.00	1	1.00	1.00
Within Replicates	48.00	48	1.00	
Total	59.75	64		

° To what extent would you like to explore a number of different occupations?

TABLE 66

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 3 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	0.00	1	0.00	0.00
B. Question Specificity	1.00	1	1.00	2.29
C. Inquiry Notification	0.00	1	0.00	0.00
D. Sex	0.25	1	0.25	0.57
AB	0.56	1	0.56	1.29
AC	0.06	1	0.06	0.14
AD	0.06	1	0.06	0.14
BC	0.56	1	0.56	1.29
BD	0.56	1	0.56	1.29
CD	0.06	1	0.06	0.14
ABC	1.00	1	1.00	2.29
ABD	0.25	1	0.25	0.57
ACD	0.25	1	0.25	0.57
BCD	0.25	1	0.25	0.57
ABCD	0.56	1	0.56	1.29
Within Replicates	21.00	48	0.44	
Total	26.44	63		

° Do you now know better exactly what people in those occupations do?

TABLE 67

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 3

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	3.50	4.00	3.75	4.00	4.25	4.13	3.75	4.13	3.94
	General	4.75	4.50	4.63	4.25	4.00	4.13	4.50	4.25	4.38
	Total	4.13	4.25	4.19	4.13	4.13	4.13	4.13	4.19	4.16 *
CHOICE DENIED	Specific	4.25	4.00	4.13	3.75	4.50	4.13	4.00	4.25	4.13
	General	4.00	4.25	4.13	4.25	4.25	4.25	4.13	4.25	4.19
	Total	4.13	4.13	4.13	4.00	4.38	4.19	4.07	4.25	4.16
TOTAL	SPECIFIC	3.88	4.00	3.94	3.88	4.38	4.13	3.88	4.19	4.03
	GENERAL	4.38	4.38	4.38	4.25	4.13	4.19	4.32	4.25	4.29
	TOTAL	4.13	4.19	4.16	4.07	4.26	4.16	4.10	4.22	4.16

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* Underlining designates means for the levels within each variable.

° Do you now know better exactly what people in those occupations do?

TABLE 68

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 4 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	0.06	1	0.06	0.27
B. Question Specificity	0.00	1	0.00	0.00
C. Inquiry Notification	0.56	1	0.56	2.45
D. Sex	0.06	1	0.06	0.27
AB	0.06	1	0.06	0.27
AC	0.25	1	0.25	1.09
AD	0.25	1	0.25	1.09
BC	0.06	1	0.06	0.27
BD	0.06	1	0.06	0.27
CD	0.25	1	0.25	1.09
ABC	0.25	1	0.25	1.09
ABD	0.25	1	0.25	1.09
ACD	0.56	1	0.56	2.45
BCD	0.00	1	0.00	0.00
ABCD	0.06	1	0.06	0.27
Within Replicates	11.00	48	0.22	
Total	13.75	63		

° Did you find that you had to change some of your ideas about what people in those occupations do?

TABLE 69

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 4

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	1.50	2.00	1.75	2.00	1.75	1.88	1.75	1.88	1.82
	General	2.00	2.00	2.00	2.00	1.50	1.75	2.00	1.75	1.88
	Total	1.75	2.00	1.88	2.00	1.63	1.82	1.88	1.82	1.85 *
CHOICE DENIED	Specific	2.00	2.00	2.00	1.50	1.75	1.68	1.75	1.88	1.82
	General	1.75	2.00	1.88	1.50	1.75	1.63	1.63	1.88	1.76
	Total	1.88	2.00	1.94	1.50	1.75	1.63	1.69	1.88	1.79
TOTAL	SPECIFIC	1.75	2.00	1.88	1.75	1.75	1.75	1.75	1.88	1.82
	GENERAL	1.88	2.00	1.94	1.75	1.63	1.69	1.82	1.82	1.82
	TOTAL	1.82	2.00	1.91	1.75	1.69	1.72	1.79	1.85	1.82

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* Underlining designates means for the levels within each variable.

° Did you find that you had to change some of your ideas about what people in those occupations do?

TABLE 70

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 5 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	3.52	1	3.52	7.58 **
B. Question Specificity	2.64	1	2.64	5.70 *
C. Inquiry Notification	1.89	1	1.89	4.09 *
D. Sex	1.27	1	1.27	2.73
AB	0.14	1	0.14	0.30
AC	0.77	1	0.77	1.65
AD	0.02	1	0.02	0.03
BC	0.14	1	0.14	0.30
BD	0.14	1	0.14	0.30
CD	1.27	1	1.27	2.73
ABC	0.39	1	0.39	0.84
ABD	0.77	1	0.77	1.65
ACD	0.77	1	0.77	1.65
BCD	0.39	1	0.39	0.84
ABCD	1.27	1	1.27	2.73
Within Replicates	22.25	48	0.46	
Total	37.61	63		

** $p \leq .01$

* $p \leq .05$

° Are you now more certain than before that you could be successful in an occupation?

TABLE 71

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 5

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	3.25	3.75	3.50	4.00	3.25	3.63	3.63	3.50	3.57
	General	4.25	4.25	4.25	4.25	3.50	3.88	4.25	3.88	4.07
	Total	3.75	4.00	3.88	4.13	3.38	3.76	3.94	3.69	3.82 *
CHOICE DENIED	Specific	4.00	3.00	3.50	3.00	2.75	2.88	3.50	2.88	3.19
	General	3.50	4.00	3.75	3.50	3.00	3.25	3.50	3.50	3.50
	Total	3.75	3.50	3.63	3.25	2.88	3.07	3.50	3.19	3.35
TOTAL	SPECIFIC	3.63	3.38	3.50	3.50	3.00	3.25	3.57	3.19	3.38
	GENERAL	3.88	4.13	4.00	3.88	3.25	3.57	3.88	3.69	3.79
	TOTAL	3.76	3.75	3.75	3.69	3.13	3.41	3.73	3.44	3.59

* Underlining designates means for the levels within each variable.

° Are you now more certain than before that you could be successful in an occupation?

TABLE 72

ANALYSIS OF VARIANCE OF SCORES ON

STUDENT REACTION SHEET ITEM 6 °

Source of Variation	Sum of Squares	Degree of Fredom	Mean Squares	F
A. Choice	0.39	1	0.39	0.81
B. Question Specificity	0.14	1	0.14	0.29
C. Inquiry Notification	0.39	1	0.39	0.81
D. Sex	1.27	1	1.27	2.61
AB	0.39	1	0.39	0.81
AC	0.14	1	0.14	0.29
AD	0.14	1	0.14	0.29
BC	2.64	1	2.64	5.45 *
BD	0.02	1	0.02	0.03
CD	1.27	1	1.27	2.61
ABC	0.14	1	0.14	0.29
ABD	0.39	1	0.39	0.81
ACD	0.39	1	0.39	0.81
BCD	0.02	1	0.02	0.03
ABCD	0.14	1	0.14	0.29
Within Replicates	23.25	48	0.48	
Total	31.11	63		

* $p \leq .05$

° Do you now know better what it would feel like to work at a particular occupation?

TABLE 73

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 6

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	3.75	4.25	4.00	4.00	4.50	4.25	3.88	4.38	4.13
	General	4.75	4.75	4.75	3.75	4.25	4.00	4.25	4.50	4.38
	Total	4.25	4.50	4.38	3.88	4.38	4.13	4.07	4.44	4.25 *
CHOICE DENIED	Specific	4.25	3.75	4.00	4.00	4.50	4.25	4.13	4.13	4.13
	General	4.25	4.25	4.25	3.50	4.25	3.88	3.88	4.25	4.07
	Total	4.25	4.00	4.13	3.75	4.38	4.07	4.00	4.19	4.10
TOTAL	SPECIFIC	4.00	4.00	4.00	4.00	4.50	4.25	4.00	4.25	4.13
	GENERAL	4.50	4.50	4.50	3.63	4.25	3.94	4.07	4.38	4.23
	TOTAL	4.25	4.25	4.25	3.82	4.38	4.10	4.04	4.32	4.18

* Underlining designates means for the levels within each variable.

° Do you now know better what it would feel like to work at a particular occupation?

TABLE 74

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 7 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	0.25	1	0.25	0.44
B. Question Specificity	0.06	1	0.06	0.11
C. Inquiry Notification	0.06	1	0.06	0.11
D. Sex	0.00	1	0.00	0.00
AB	0.06	1	0.06	0.11
AC	0.56	1	0.56	0.98
AD	1.00	1	1.00	1.75
BC	0.25	1	0.25	0.44
BD	0.06	1	0.06	0.11
CD	0.56	1	0.56	0.98
ABC	0.25	1	0.25	0.44
ABD	0.56	1	0.56	0.98
ACD	1.56	1	1.56	2.73
BCD	0.25	1	0.25	0.44
ABCD	0.00	1	0.00	0.00
Within Replicates	27.50	48	0.57	
Total	33.00	63		

° Do you now know better exactly what would be expected of you on a job?

TABLE 75

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 7

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	4.25	4.00	4.13	4.75	4.00	4.38	4.50	4.00	4.25
	General	4.00	4.00	4.00	4.25	4.25	4.25	4.13	4.13	4.13
	Total	4.13	4.00	4.07	4.50	4.13	4.32	4.32	4.07	4.19 *
CHOICE DENIED	Specific	4.00	4.00	4.00	3.75	4.50	4.13	3.88	4.25	4.07
	General	4.50	4.00	4.25	3.50	4.25	3.88	4.00	4.13	4.07
	Total	4.25	4.00	4.13	3.63	4.38	4.00	3.94	4.19	4.07
TOTAL	SPECIFIC	4.13	4.00	4.07	4.25	4.25	4.25	4.16	4.13	4.15
	GENERAL	4.25	4.00	4.13	3.88	4.25	4.07	4.07	4.13	4.10
	TOTAL	4.19	4.00	4.10	4.07	4.25	4.16	4.13	4.13	4.13

* Underlining designates means for the levels within each variable.

° Do you now know better exactly what would be expected of you on a job?

TABLE 76

ANALYSIS OF VARIANCE OF SCORES ON STUDENT REACTION SHEET ITEM 8 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	3.06	1	3.06	3.54
B. Question Specificity	0.25	1	0.25	0.29
C. Inquiry Notification	0.06	1	0.06	0.07
D. Sex	1.56	1	1.56	1.81
AB	0.25	1	0.25	0.29
AC	1.56	1	1.56	1.81
AD	1.56	1	1.56	1.81
BC	0.25	1	0.25	0.29
BD	2.25	1	2.25	2.60
CD	0.56	1	0.56	0.65
ABC	0.25	1	0.25	0.29
ABD	0.25	1	0.25	0.29
ACD	0.06	1	0.06	0.07
BCD	1.00	1	1.00	1.16
ABCD	0.00	1	0.00	0.00
Within Replicates	41.50	48	0.86	
Total	54.44	64		

° Do you feel that you know better now what you yourself would enjoy and be good at in an occupation?

TABLE 77

MEANS FOR SCORES ON STUDENT REACTION SHEET ITEM 8

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	4.00	3.25	3.63	4.00	4.25	4.13	4.00	3.75	3.88
	General	3.75	4.00	3.88	3.75	4.00	3.88	3.75	4.00	3.88
	Total	3.88	3.63	3.79	3.88	4.13	4.00	3.88	3.88	3.88 *
CHOICE DENIED	Specific	4.50	3.00	3.75	3.75	3.00	3.38	4.13	3.00	3.57
	General	3.50	3.50	3.50	3.25	3.00	3.13	3.38	3.25	3.32
	Total	4.00	3.25	3.63	3.50	3.00	3.25	3.75	3.13	3.45
TOTAL	SPECIFIC	4.25	3.13	3.69	3.88	3.63	3.76	4.07	3.38	3.72
	GENERAL	3.63	3.75	3.69	3.50	3.50	3.50	3.57	3.63	3.59
	TOTAL	3.94	3.44	3.69	3.69	3.57	3.63	3.82	3.50	3.66

* Underlining designates means for the levels within each variable.

° Do you feel that you know better now what you yourself would enjoy and be good at in an occupation?

TABLE 78

ANALYSIS OF VARIANCE OF SUM OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEMS 1-4

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	3.06	1	3.06	6.26 *
B. Question Specificity	0.00	1	0.00	0.00
C. Inquiry Notification	1.00	1	1.00	2.04
D. Sex	0.06	1	0.06	0.13
AB	0.06	1	0.06	0.13
AC	0.06	1	0.06	0.13
AD	1.00	1	1.00	2.04
BC	1.00	1	1.00	2.04
BD	0.56	1	0.56	1.15
CD	0.56	1	0.56	1.15
ABC	0.56	1	0.56	1.15
ABD	0.00	1	0.00	0.00
ACD	0.25	1	0.25	0.51
BCD	0.06	1	0.06	0.13
ABCD	0.25	1	0.25	0.51
Within Replicates	23.50	48	0.49	
Total	32.00	63		

* $p \leq .05$

TABLE 79

MEANS FOR SUM OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEMS 1-4 BY INDEPENDENT VARIABLE CATEGORIES

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	0.75	1.00	0.88	1.75	1.25	1.50	1.25	1.13	1.19
	General	1.50	1.25	1.38	1.50	0.75	1.13	1.50	1.00	1.25
	Total	1.13	1.13	1.13	1.63	1.00	1.32	1.38	1.07	1.22 *
CHOICE DENIED	Specific	0.50	0.75	0.63	0.75	1.25	1.00	0.63	1.00	0.82
	General	0.50	0.75	0.63	1.00	0.75	0.88	0.75	0.75	0.75
	Total	0.50	0.75	0.63	0.88	1.00	0.94	0.69	0.88	0.79
TOTAL	SPECIFIC	0.63	0.88	0.76	1.25	1.25	1.25	0.94	1.07	1.00
	GENERAL	1.00	1.00	1.00	1.25	0.75	1.00	1.13	0.88	1.00
	TOTAL	0.82	0.94	0.88	1.25	1.00	1.13	1.03	0.97	1.00

* Underlining designates means for the levels within each variable.

TABLE 80

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 1 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	17.02	1	17.02	3.94
B. Question Specificity	1.89	1	1.89	0.44
C. Inquiry Notification	1.89	1	1.89	0.44
D. Sex	4.52	1	4.52	1.05
AB	0.39	1	0.39	0.09
AC	0.02	1	0.02	0.00
AD	13.14	1	13.14	3.04
BC	0.02	1	0.02	0.00
BD	0.02	1	0.02	0.00
CD	3.52	1	3.52	0.81
ABC	0.39	1	0.39	0.09
ABD	5.64	1	5.64	1.31
ACD	0.77	1	0.77	0.18
BCD	1.27	1	1.27	0.29
ABCD	1.27	1	1.27	0.29
Within Replicates	207.25	48	4.32	
Total	258.98	63		

° During the past seven days how much time have you spent talking about your possible future occupations?

TABLE 81

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 1

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	2.00	3.00	2.50	2.00	2.75	2.38	2.00	2.88	2.44
	General	1.25	4.50	2.88	2.00	2.75	2.38	1.63	3.63	2.63
	Total	1.63	3.75	2.69	2.00	2.75	2.38	1.82	3.25	2.54 *
CHOICE DENIED	Specific	1.25	1.75	1.50	1.00	1.00	1.00	1.13	1.38	1.25
	General	2.25	1.50	1.88	2.25	1.00	1.63	2.25	1.25	1.75
	Total	1.75	1.63	1.69	1.63	1.00	1.32	1.69	1.32	1.50
TOTAL	SPECIFIC	1.63	2.38	2.00	1.50	1.87	1.69	1.57	2.13	1.85
	GENERAL	1.75	3.00	2.38	2.13	1.87	2.00	1.94	2.44	2.19
	TOTAL	1.69	2.69	2.19	1.82	1.87	1.85	1.76	2.29	2.02

* Underlining designates means for the levels within each variable.

° During the past seven days how much time have you spent talking about your possible future occupations?

TABLE 82

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 2 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	0.39	1	0.39	5.00 *
B. Question Specificity	0.02	1	0.02	0.20
C. Inquiry Notification	0.02	1	0.02	0.20
D. Sec	0.02	1	0.02	0.20
AB	0.02	1	0.02	0.20
AC	0.02	1	0.02	0.20
AD	0.02	1	0.02	0.20
BC	0.14	1	0.14	1.80
BD	0.02	1	0.02	0.20
CD	0.02	1	0.02	0.20
ABC	0.14	1	0.14	1.80
ABD	0.02	1	0.02	0.20
ACD	0.02	1	0.02	0.20
BCD	0.02	1	0.02	0.20
ABCD	0.02	1	0.02	0.20
Within Replicates	3.75	48	0.08	
Total	4.61	63		

* $p \leq .05$

° Did you mail the post card requesting information about occupations?

TABLE 83

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 2

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	0.00	0.00	0.00	0.25	0.25	0.25	0.13	0.13	0.13
	General	0.25	0.25	0.25	0.25	0.00	0.13	0.25	0.13	0.19
	Total	0.13	0.13	0.13	0.25	0.13	0.19	0.19	0.13	0.16 *
CHOICE DENIED	Specific	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	SPECIFIC	0.00	0.00	0.00	0.13	0.13	0.13	0.07	0.07	0.07
	GENERAL	0.13	0.13	0.13	0.13	0.00	0.07	0.13	0.07	0.10
	TOTAL	0.07	0.07	0.07	0.13	0.07	0.10	0.10	0.07	0.09

* Underlining designates means for the levels within each variable.

° Did you mail the post card requesting information about occupations?

TABLE 84

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 3 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	0.06	1	0.06	1.00
B. Question Specificity	0.06	1	0.06	1.00
C. Inquiry Notification	0.25	1	0.25	4.00
D. Sex	0.00	1	0.00	0.00
AB	0.00	1	0.00	0.00
AC	0.06	1	0.06	1.00
AD	0.06	1	0.06	1.00
BC	0.06	1	0.06	1.00
BD	0.06	1	0.06	1.00
CD	0.00	1	0.00	0.00
ABC	0.00	1	0.00	0.00
ABD	0.00	1	0.00	0.00
ACD	0.06	1	0.06	1.00
BCD	0.06	1	0.06	1.00
ABCD	0.00	1	0.00	0.00
Within Replicates	3.00	48	0.06	
Total	3.75	63		

° During the past seven days have you written anywhere else for occupational information?

TABLE 85

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 3

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	0.00	0.00	0.00	0.25	0.25	0.25	0.13	0.13	0.13
	General	0.00	0.00	0.00	0.00	0.25	0.13	0.00	0.13	0.07
	Total	0.00	0.00	0.00	0.13	0.25	0.19	0.07	0.13	0.10 *
CHOICE DENIED	Specific	0.00	0.00	0.00	0.25	0.00	0.13	0.13	0.00	0.07
	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.13	0.00	0.07	0.07	0.00	0.04
TOTAL	SPECIFIC	0.00	0.00	0.00	0.25	0.13	0.19	0.13	0.07	0.10
	GENERAL	0.00	0.00	0.00	0.00	0.13	0.07	0.00	0.07	0.04
	TOTAL	0.00	0.00	0.00	0.13	0.13	0.13	0.07	0.07	0.07

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* Underlining designates means for the levels within each variable.

° During the past seven days have you written anywhere else for occupational information?

TABLE 86

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 4 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	0.25	1	0.25	2.67
B. Question Specificity	0.56	1	0.56	6.00 *
C. Inquiry Notification	0.25	1	0.25	2.67
D. Sec	0.25	1	0.25	2.67
AB	0.06	1	0.06	0.67
AC	0.25	1	0.25	2.67
AD	0.25	1	0.25	2.67
BC	0.06	1	0.06	0.67
BD	0.06	1	0.06	0.67
CD	0.25	1	0.25	2.67
ABC	0.06	1	0.06	0.67
ABD	0.06	1	0.06	0.67
ACD	0.00	1	0.00	0.00
BCD	0.06	1	0.06	0.67
ABCD	0.06	1	0.06	0.67
Within Replicates	4.50	48	0.09	
Total	7.00	63		

* $p \leq .05$

° During the past seven days have you read any books or pamphlets about any jobs or about choosing an occupation?

TABLE 87

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 4

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	0.00	0.00	0.00	0.25	0.00	0.13	0.13	0.00	0.07
	General	0.25	0.00	0.13	0.75	0.25	0.50	0.50	0.13	0.32
	Total	0.13	0.00	0.07	0.50	0.13	0.32	0.32	0.07	0.19 *
CHOICE DENIED	Specific	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	General	0.00	0.25	0.13	0.25	0.00	0.13	0.13	0.13	0.13
	Total	0.00	0.13	0.07	0.13	0.00	0.07	0.07	0.07	0.07
TOTAL	SPECIFIC	0.00	0.00	0.00	0.13	0.00	0.07	0.07	0.00	0.04
	GENERAL	0.13	0.13	0.13	0.50	0.13	0.32	0.32	0.13	0.23
	TOTAL	0.07	0.07	0.07	0.32	0.07	0.19	0.19	0.07	0.13

* Underlining designates means for the levels within each variable.

° During the past seven days have you read any books or pamphlets about any jobs or about choosing an occupation?

TABLE 88

ANALYSIS OF VARIANCE OF SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 5 °

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F
A. Choice	0.14	1	0.14	1.80
B. Question Specificity	0.14	1	0.14	1.80
C. Inquiry Notification	0.02	1	0.02	0.20
D. Sex	0.14	1	0.14	1.80
AB	0.02	1	0.03	0.20
AC	0.39	1	0.39	5.00 *
AD	0.77	1	0.77	9.80 **
BC	0.14	1	0.14	1.80
BD	0.02	1	0.02	0.20
CD	0.39	1	0.39	5.00 *
ABC	0.02	1	0.02	0.20
ABD	0.14	1	0.14	1.80
ACD	0.02	1	0.02	0.20
BCD	0.02	1	0.02	0.20
ABCD	0.14	1	0.14	1.80
Within Replicates	3.75	48	0.08	
Total	6.23	63		

* $p \leq .05$

** $p \leq .01$

° Realistically, when it comes to choosing a job I will (check what you really will do).

TABLE 89

MEANS FOR SCORES ON VOCATIONAL PLANNING QUESTIONNAIRE ITEM 5

BY INDEPENDENT VARIABLE CATEGORIES °

		NOTIFIED			NOT NOTIFIED			TOTAL		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
CHOICE RECEIVED	Specific	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	General	2.00	1.50	1.75	2.00	2.00	2.00	2.00	1.75	1.88
	Total	2.00	1.75	1.88	2.00	2.00	2.00	2.00	1.88	1.94 *
CHOICE DENIED	Specific	2.00	2.00	2.00	1.50	2.00	1.75	1.75	2.00	1.88
	General	1.75	2.00	1.88	1.50	2.00	1.75	1.63	2.00	1.82
	Total	1.88	2.00	1.94	1.50	2.00	1.75	1.69	2.00	1.85
TOTAL	SPECIFIC	2.00	2.00	2.00	1.75	2.00	1.88	1.88	2.00	1.94
	GENERAL	1.88	1.75	1.82	1.75	2.00	1.88	1.82	1.88	1.85
	TOTAL	1.94	1.88	1.91	1.75	2.00	1.88	1.85	1.94	1.90

* Underlining designates means for the levels within each variable.

° Realistically, when it comes to choosing a job I will (Check what you really will do).

APPENDIX G

RAW SCORE DISTRIBUTIONS FOR ACHIEVEMENT TESTS FOR EACH OCCUPATION

TABLE 90

RAW SCORE DISTRIBUTIONS FOR ACHIEVEMENT TESTS FOR EACH OCCUPATION

RAW SCORE	FREQUENCY IN EACH OCCUPATION						
	ACCT	APPL SERV	ELEC TECH	MED LAB	POLICE	SALES	X-RAY
0	1	0	0	0	1	1	0
1	0	0	0	0	0	0	0
2	0	0	0	0	0	1	0
3	0	0	0	1	0	0	0
4	0	0	0	0	0	0	0
5	1	0	1	1	0	0	0
6	0	0	1	0	1	3	0
7	2	0	8	0	0	2	0
8	8	0	4	0	2	6	5
9	4	2	6	7	1	3	5
10	10	3	5	5	3	5	8
11	6	2	6	8	4	8	6
12	7	3	10	13	9	14	3
13	5	1	4	18	6	14	2
14	2	3	1	4	3	8	3
15	2	2	2	3	4	4	0
16	0	0	0	3	5	3	0
17	0	0	0	1	0	0	0
18	0	0	0	0	1	0	0
19	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0
TOTALS	48	16	48	64	40	72	32
MEANS	10.25	11.94	10.10	11.95	12.28	11.35	10.47
STANDARD DEVIATION	2.66	1.98	2.43	2.36	3.19	3.03	1.85

APPENDIX H

TEST OF THE DIFFERENCE BETWEEN OCCUPATIONAL CHOICES OF MALE AND FEMALE SUBJECTS

TABLE 91

TEST OF THE DIFFERENCE BETWEEN OCCUPATIONAL CHOICES OF MALE AND FEMALE SUBJECTS

F*	(f-F)	$(f-F)^2$	$(f-F)^2/F$
1	0	0	0.00
6	4	16	2.67
1	5	25	25.00
4	1	1	0.25
6	16	256	42.67
1	0	0	0.00
10	10	100	10.00
1	1	1	1.00
11	10	100	9.09
5	5	25	5.00
0	0	0	0.00
6	4	16	2.67
5	3	9	1.80
5	1	1	0.20
14	14	196	14.00
4	2	4	1.00
1	14	196	196.00
9	14	196	21.78
13	4	13	1.23
3	1	1	0.33
2	1	1	0.50
			TOTAL 335.19

$\chi^2 = \Sigma\ (f - F)^2/F$ (Walker and Lev, p.85, 1953)

$\chi^2 = 335.19$ $(k-1)=20$

$p < .001$

* F = Expected frequency
  f = Observed frequency
  k = Number of events
  k-1 = Degrees of freedom

APPENDIX I

UNANALYZED DATA FROM ITEMS IN THE VOCATIONAL PLANNING QUESTIONNARE

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TABLE 92

SUMMARY OF RESPONSES TO VOCATIONAL PLANNING QUESTIONNAIRE ITEM 1(a)* FOR MALES

INTENDED CAREERS, OCCUPATIONS OR ACTIVITIES	FREQUENCY
Artist	2
Coast Guard	1
College	3
Commercial Pilot	3
Demolitions Worker	1
Electronics (unspecified)	2
Mechanic	1
Medical Doctor	1
Military (unspecified)	1
Salesman	1
Sports	1
Teacher	4
Trade School (unspecified)	3
None	2
Do Not Know	4
No Response	5
TOTAL	34

* Item 1 asks: "During the past seven days how much time have you spent talking about your possible future occupations?"

Item 1(a): "If you checked 'None,' explain what your career plans are."

TABLE 93

SUMMARY OF RESPONSES TO VOCATIONAL PLANNING QUESTIONNAIRE ITEM 1(a)* FOR FEMALES

INTENDED CAREERS, OCCUPATIONS OR ACTIVITIES	FREQUENCY
Accountant	1
Artist	1
Beautician	2
College	3
Dental Technician	2
Fashion Design	1
Grocery Clerk	1
Journalist	1
Marriage	2
Navy	1
Secretary	1
Stewardess	1
Teacher	5
Do Not Know	2
No Response	2
TOTAL	26

* Item 1 asks: "During the past seven days how much time have you spent talking about your possible future occupations?"

Item 1(a): "If you checked 'None,' explain what your career plans are."

TABLE 94

SUMMARY OF RESPONSES TO VOCATIONAL PLANNING QUESTIONNAIRE ITEM 1(b)* FOR MALES AND FEMALES

PERSONS SPOKEN WITH	MALES		FEMALES	
	FREQUENCY	PERCENT	FREQUENCY	PERCENT
Friend(s)	34	.40	44	.40
Parent(s)	32	.37	42	.38
Relative(s)	6	.07	12	.11
Teacher(s)	7	.08	4	.03
Counselor(s)	0	.00	4	.03
Other(s)	4	.05	3	.03
No response	2	.02	2	.02
TOTALS	85	.99	111	1.00

* Item 1 asks: "During the past seven days how much time have you spent talking about your possible future occupations?"

Item 1(b): "If you did talk with some persons about possible occupations, check who they were."

TABLE 95

SUMMARY OF RESPONSES TO VOCATIONAL PLANNING QUESTIONNAIRE ITEM 3(a)* FOR MALES

OCCUPATIONAL INFORMATION DESIRED	FREQUENCY
Airline Pilot	5
Architect	3
Artist	1
Baker	1
Building Contractor	1
Carpenter	2
College	3
Data Processor	1
Electronics	5
Engineer	2
Forest Ranger	3
Game (wild) Manager	1
General Occupational Information	6
Journalist	1
Lawyer	2
Law Enforcement Officer	3
Machinist	3
Mechanic	4
M.D./Dentist	3
Military	2
Oceanographer	2
Photographer	1
Physical Therapist	1
Salesman	3
Sheetmetal Worker	1
Teacher	4
Tree Surgeon	1
Truck Driver	1
None	10
No Response	9
TOTAL	85

* Item 3 asks: "During the past seven days have you written anywhere else for occupational information?"

Item 3(a): "If you answered 'No,' explain what kind of information you would like to have."

TABLE 96

SUMMARY OF RESPONSES TO VOCATIONAL PLANNING QUESTIONNAIRE ITEM 3(a)* FOR FEMALES

OCCUPATIONAL INFORMATION DESIRED	FREQUENCY
Accountant	3
Advertizer	1
Artist	1
Beautician	4
Business Secretary	7
College	3
Court Reporter	1
Dental Technician	2
Dietician	1
Electronics	2
Fashion Designer	2
General Occupational Information	7
Home Economist	1
Interior Decorator	1
Lawyer	2
Law Enforcement Officer	1
Medical Technologist	5
Military	1
Model	2
Nurse	6
Saleswoman	1
Social Worker	2
Stewardess	4
Teacher	8
X-Ray Technician	1
None	4
Do Not Know	2
No Response	12
TOTAL	87

* Item 3 asks: "During the past seven days have you written anywhere else for occupational information?"

Item 3(a): "If you answered 'No,' explain what kind of information you would like to have."

TABLE 97

SUMMARY OF RESPONSES TO VOCATIONAL PLANNING QUESTIONNAIRE ITEM 3(b)* FOR MALES AND FEMALES

SEX	INFORMATION REQUESTED	SOURCE	FREQUENCY
Males	Police work	Redwood City Police Dept	2
	Radio announcer	KFOG, San Francisco	1
	Shipyard work	Hunters Point Shipyard, San Francisco	1
		TOTAL	4
Females	Interior design	La Salle College	1
	Language schools	(no response)	1
		TOTAL	2

* Item 3 asks: "During the past seven days have you written anywhere else for occupational information?"

Item 3(b): "If you answered 'Yes,' tell what you requested (the kind of information and/or to whom you wrote)."

VOCATIONAL PLANNING QUESTIONNAIRE ITEM 4(a)

The responses to Item 4(a) were the same as those to Item 3(a). In the latter item subjects were asked what kinds of occupational information would be desirable to them; the former item inquired about the kinds of occupational books or pamphlets would be useful to them.

TABLE 98

SUMMARY OF RESPONSE TO VOCATIONAL PLANNING QUESTIONNAIRE ITEM 4(b)* FOR MALES AND FEMALES

SEX	INFORMATION READ	SOURCE	FREQUENCY
Males	Architecture	Friend's Home	1
	Automobile Mechanic	Auto. Union Office	1
	Business Magazine	Home	1
	Careers in Woodworking	Library (public)	1
	College Catalog	Home	1
	Electronics Technician	Treatment Folder	1
	Journalism	Class Teacher	1
	Music	Library (public)	1
	Planning Board Consultant	School Bulletin Board	1
	Shipyard Work	Hunters Point Shipyard	2
	State Dept. Careers	Home	1
	State Police Careers	Highway Patrol Office	1
			TOTAL 13
Females	Business Secretary	Home Magazine	2
	Junior College Courses	Home (Brother)	1
	Electronic Technician	Treatment Folder	1
	Medical Technology	Treatment Folder	2
	Missionary Work	Religious Rally	1
	Sales	Home	1
	Social Work	Court House	1
	Teaching	Library (public)	1
			TOTAL 10

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* Item 4 asks: "During the past seven days have you read any books or pamphlets about any jobs or about choosing and occupation.

Item 4(b) "If you answered 'Yes,' tell what you can remember about one thing you read."

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